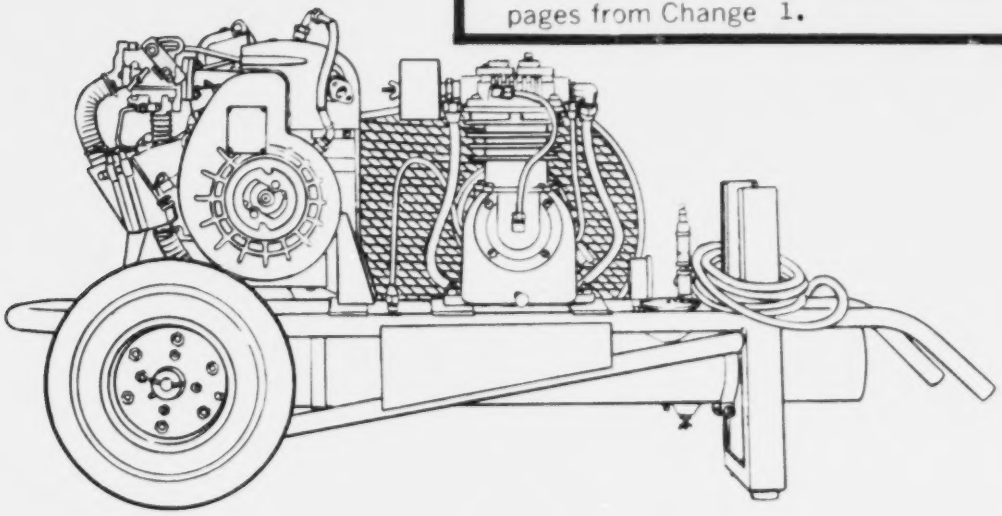
5-4310-360-14

TECHNICAL MANUAL

OPERATOR, ORGANIZATIONAL, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL

This copy is a reprint which includes current pages from Change 1.



COMPRESSOR, RECIPROCATING: AIR: HANDTRUCK MOUNTED, GASOLINE ENGINE DRIVEN 5 CFM, 175PSI (C & H DISTRIBUTORS MODEL 20-902/3)

NSN 4310-01-055-0594

HEADQUARTERS, DEPARTMENT OF THE ARMY

25 May 1979

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READEX FICHE best copy available

WARNING: Before starting engine or operating any of the components ensure that no loose bars, tools, or parts are lying in or on any part of the equipment, as they could cause serious damage to equipment or bodily injury to personnel.

WARNING: Never wear loose clothing, or hanging appendages from person or clothing, while inspecting running engine, moving shafts, or like machinery.

WARNING: Disconnect the spark plug cables prior to engine maintenance to prevent accidental starting and severe shock.

WARNING: Do not touch the ignition system harness during starting or while in operation; Severe shocks or burns could result, and personnel may be seriously injured.

WARNING: When handling gasoline, always provide a metal-to-metal contact between the container and tank. This will prevent a spark from being generated as gasoline flows over the metallic surface.

WARNING: Before refueling, ensure that adequate fire fighting equipment is serviceable and is standing by for immediate use in event of fire or explosion.

WARNING: During operation, proper fire fighting equipment should be serviceable and kept near in the event that fire is developed by electrostatic spark or detonation of the gas fumes. Do not smoke or use an open flame in vicinity of these gasoline vapor hazards.

WARNING: Do not refule while engine is in operation.

WARNING: Never touch engine or engine accessories with bare hands during operation, or before they have cooled sufficiently. Severe burns can be caused through carelessness.

WARNING: Never attempt to service any of the air compressor components until the unit is relieved of all air pressure.

WARNING: Do not operate the air compressor in an enclosed area unless the exhaust gases are piped to the outside. The exhaust gases contain carbon monoxide, which is a colorless, odorless, and poisonous gas.

WARNING: Do not weld repair air receiver tank.

WARNING: Do not operate the air compressor with the belt guard removed.

WARNING: Do not operate air compressor in a tilted position.

WARNING: This compressor is not suitable for the supply of air for charging cylinders with breathable air.

WARNING: Operation of this equipment presents a noise hazard to personnel in the area. The noise level exceeds the allowable limits for unprotected personnel. Wear ear muffs or earplugs which were fitted by a trained professional.

WARNING: Make certain any lifting device used has a capacity equal to the weight being lifted. Failure to observe this precaution could result in injury or death to personnel and damage to equipment.

WARNING: Drycleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact by wearing rubber or solvent impermeable gloves when handling the solvent or material wet with drycleaning solvent. Wash hands immediately after exposure with soap and water and use a lanolin based skin cream to prevent skin drying. Do not use near open flame or excessive heat. Flash point of solvent is 100°F (38°C). Ensure that ventilation adequate to reduce solvent vapor concentrations below acceptable threshold limit values is provided.

WARNING: When using compressed air for blowing, air hose pressure must not exceed 30 psig, and individuals must wear eye protective equipment.

TM 5-4310-360-14
C 1

CHANGE NO. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 6 February 1984

Operator, Organizational, Direct Support and
General Support Maintenance Manual

COMPRESSOR, RECIPROCATING: AIR:
HANDTRUCK MOUNTED, GASOLINE ENGINE
DRIVEN 5 CFM, 175PSI
(C & H DISTRIBUTORS MODEL 20-902/3)
NSN 4310-01-055-0594

TM 5-4310-360-14, 25 May 1979, is changed as follows:

1. Remove and insert pages as indicated below.

	Remove pages	Insert pages
Chapter 2	2-7 thru 2-10	2-7 thru 2-10
Chapter 4	4-1 and 4-2	4-1 and 4-2
	4-7 thru 4-10	4-7 thru 4-10
	4-15 and 4-16	4-15 and 4-16
	4-19 thru 4-22	4-19 thru 4-22
Chapter 6	6-3 and 6-4	6-3 and 6-4

2. New or changed text material is indicated by a vertical bar in the margin. An illustration change is indicated by a miniature pointing hand.

3. Retain this sheet in front of manual for reference purposes.

By Order of the Secretary of the Army:

JOHN A. WICKHAM, JR.
General, United States Army
Chief of Staff

Official:

ROBERT M. JOYCE
Major General, United States Army
The Adjutant General

DISTRIBUTION:
To be distributed in accordance with DA Form 12-25A, Operator Maintenance requirements for Air Compressors, 5 CFM.

TECHNICAL MANUAL
No. 5-4310-360-14

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C. 25 May 1979

OPERATOR, ORGANIZATIONAL, DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL

COMPRESSOR, RECIPROCATING: AIR: HANDTRUCK MOUNTED, GASOLINE ENGINE DRIVEN 5CFM, 175 PSI

(C & H DISTIBUTORS MODEL 20-902/3)

NSN 4310-01-055-0594

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistake or if you know of a way to improve the procedure, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) direct to: Commander, US Army Troop Support and Aviation Materiel Readiness Command, ATTN: DRSTS-MTPS, 4300 Goodfellow Blvd, St. Louis, MO 63120. A reply will be furnished to you.

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CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. Scope.

This manual is for your use in operating and maintaining the Model 20-902/3 Reciprocating Air Compressor. Chapters 2 and 3 provide information on operation, preventive maintenance services, and operator's maintenance of equipment, accessories, components and attachments. Chapter 4 provides information for organizational maintenance. Chapters 5 and 6 provide information for direct and general support maintenance. Also included are descriptions of main units and their functions in relationship to other components.

1-2. Maintenance Forms and Records.

a. Equipment maintenance forms and procedures for their use are contained in TM 38-750, The Army Maintenance Management System (TAMMS).

b. Hand receipts for the End Item/Components of End Item (COEI), Basic Issue Items (BII), and Additional Authorization List (AAL) items are published in a Hand Receipt Manual. The Hand Receipt Manual numerical designation is the same as the related Technical Manual with the letters HR added to the number. These manuals are published to aid in property accountability and are available through: Commander, US Army Adjutant General Publication Center, ATTN: AGDL-OD, 1655 Woodson Road, St. Louis, MO 63114.

1-3. Reporting Equipment Improvement Recommendations (EIR'S).

EIR can and must be submitted by anyone who is aware of an unsatisfactory condition with the equipment design or use. It is not necessary to show a new design or list a better way to perform a procedure, just simply tell why the design is unfavorable or why a procedure is difficult. EIR may be submitted on SF 368 (Quality Deficiency Report). Instructions for preparing EIR's are provided in TM 38-750, The Army Maintenance Managements System. Mail directly to Commander Headquarter, U.S. Army Troop Support and Aviation Material Readiness Command, ATTN: DRSTS-MEM, 4300 Goodfellow Blvd., St. Louis, Missouri 63120. A reply will be furnished directly to you.

1-4. Warranty Information.

All components of the Reciprocating Air Compressor with the exception of the engine are warranted by C & H Distributors Inc. for a period of 17 months. The warranty starts on the date found in block 23, DA Form 2408-9, in the logbook. Report all defects in material or workmanship to your supervisor, who will take appropriate action through your organizational maintenance shop.

Section II. EQUIPMENT DESCRIPTION

1-5. Purpose of the Air Compressor.

A portable, handtruck mounted air compressor for inflating tires and running pneumatic equipment in the field.

1-6. Capabilities and Features.

- Delivers 5 cfm of air at 175 psi.
- Handtruck mounted
- Gasoline engine driven
- Incorporates air hose and inflator gage
- All weather operational
- Highly portable

1-7. Location & Description of Major Components.

ENGINE (1). Single cylinder, 4 cycle, air cooled, 1.5 hp, gasoline engine. Refer to TM 5-2805-208-14 for detailed description.

AIR CLEANER (2). Dry type. Element may be removed and cleaned.

COMPRESSOR (3). 2-stage design. 5 cfm, 175 psi output.

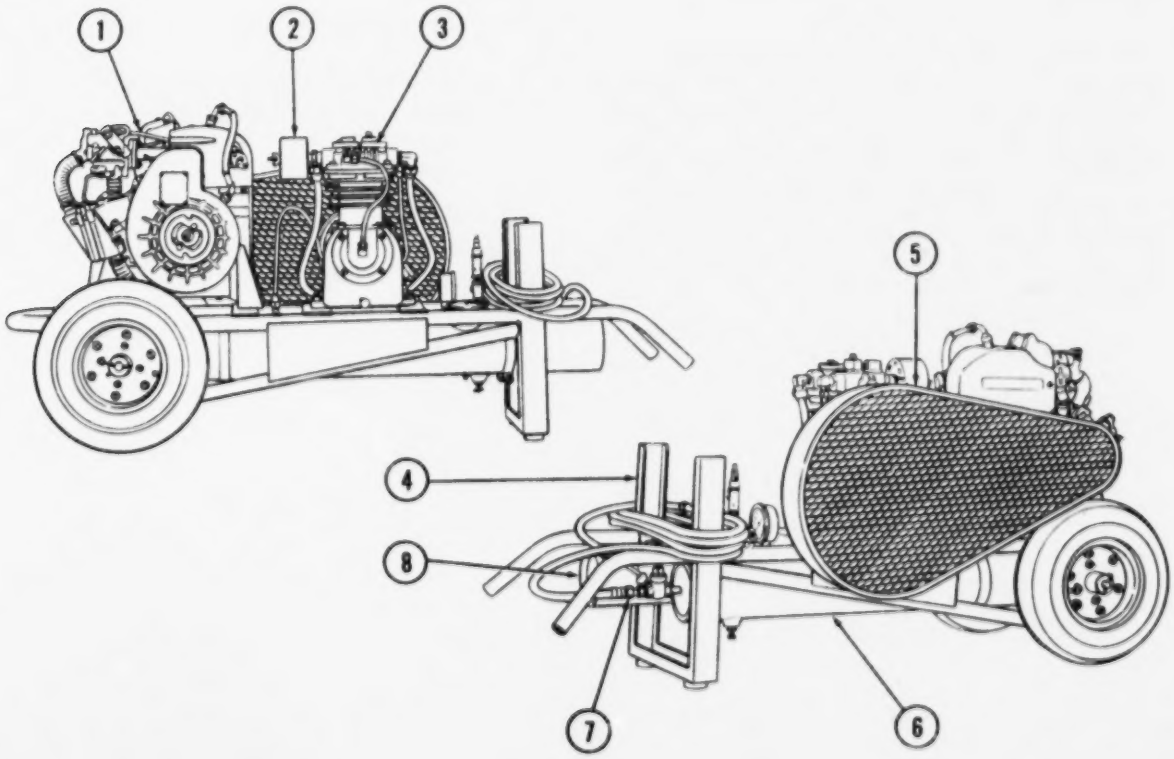
HANDTRUCK (4). Welded aluminum frame with pneumatic tires.

COMPRESSOR DRIVE AND BELT GUARD (5). Two matched V belts transmit power. Belt guard protects operator as well as pulleys and flywheels.

AIR TANK (6). Aluminum tank with pressure gage, draincock, shutoff valve, and unloader valve.

AIR HOSE AND INFLATOR GAGE (7). 50 ft rubber hose. Inflator gage equipped with regular and jumbo size air chucks.

FUEL TANK (8). Welded aluminum construction with strainer type fill opening.



1-8. Differences between Models.

This manual covers only the C & H Distributors Model 20-902/3 Air Compressor. No unit differences exist for the model covered by this manual.

1-9. Performance Data

a. Model 20-902/3 air compressor.

Manufacturer	C & H Distributors Inc.
Model	20-902/3
Output	5 cfm at 175 psi
Type	Gas engine driven, hand-truck mounted
Serial Number	25000 through 25344

b. Engine.

Make	Military Standard Engine
Model	1A08-3
Type	4-Cycle, gasoline, overhead valve, air cooled
Number of cylinders	1
Bore	2.250 in. (5.715 cm)
Stroke	2 in. (5.08 cm)
Piston displacement	8 cu. in. (131.12 cu cm)
Compression ratio	6:1
Horsepower at 3,600 rpm	1.5

c. Air compressor.

Manufacturer	C & H Distributors Inc.
Model	86-083
Type	2 Stage Vertical
Speed	860 rpm
Bore and stroke	
Low pressure	3 in. x 2 in. (7.62 cm x 5.08 cm)
High pressure	1-1/2 in. x 2 in. (3.81 cm x 5.08 cm)

d. Compressor air cleaner.

Manufacturer	C & H Distributors Inc.
Type	Dry type-cleanable

e. Capacities.

Compressor crankcase	1-2/3 pints (0.8 liters)
Air receiver tank	2 gallons (7.6 liters)
Fuel tank	1.9 gallons (7.2 liters)

1-10. Organizational Maintenance Data.

a. Compressor.

(1) Air hose.

Length	50 feet (15.2 m)
Diameter	5/16 inside diameter (7.9 mm)
Maximum pressure	200 psi (14 kg/sq cm)

(2) Dimensions and weight.

Length	52 inches (1.32 m)
Width	22 inches (0.56 m)
Height	27 inches (0.69 m)
Weight, net	146 lbs. (66.4 kg)
Shipping weight	245 lbs. (111.4 kg)
Volume	45.1 cu ft (1.277 cu m)

b. Engine.

(1) Carburetor.

Make	Military design

(2) Fuel pump.

Make	Military design
Type	Diaphragm
Fuel pump outlet pressure	3.0 to 4.5 psi (0.21 to 0.32 kg/sq cm)

(3) Air cleaner.

Make	Military design
Type:	
Model 1A08-3	Dry

(4) Spark plug.

Make ..... Military Standard
Type ..... Shielded

(5) Governor.

Make ..... Military design

(6) Fuel filter.

Make ..... Military design

(7) Adjustments.

Spark plug gap ..... 0.028-0.033 in. (0.071-0.084 cm)
Contact point gap ..... 0.016-0.020 in. (0.406-0.050 cm)
Valve Tappet clearance (intake and exhaust) ... 0.007 in. to 0.009 in. (0.017 to 0.027 cm) cold

(8) Oil capacities.

Model 1A08-3 ..... 1/2 qt. (0.47 liter)

(9) Dimensions and weights (Model 1A08-3).

Length ..... 17-3/4 in. (45.08 cm)
Width ..... 17-3/4 in. (45.08 cm)
Height ..... 14-1/4 in. (36.19 cm)
Weight ..... 29 lbs. (13.15 kg)

1-11. Direct and General Support Maintenance Data.

a. Compressor Torque Data.
Cylinder head bolts .... 10 ft-lb
Cylinder to base bolts ... 18 ft-lb
End cover bolts ..... 5 ft-lb
Connecting rod bolts ... 8 ft-lb
Flywheel pulley bolt ... 43 ft-lb

b. Engine. See TM 5-2805-256-14 for detailed engine data.

1-12. Compressor Repair and Replacement Standards. Table 1-1 lists the manufacturer's sizes, tolerances, desired clearances and maximum allowable wear for the Air Compressor, Model 86-083.

NOTE: The manufacturer's dimensions and tolerances are given in inches and centimeters. Centimeters are enclosed in parentheses.

1-12. Direct and General Support Maintenance Data - continued.

Table 1-1. Compressor Repair and Replacement Standards

Components	Mfr's Dimensions and Tolerances in Inches (cm)		Desired Clearance in Inches (cm)		Maximum Allowable Wear and Clearance in Inches (cm)
	Minimum	Maximum	Minimum	Maximum	
Cylinders:					
Bore, low pressure	3.0000 (7.6200)	3.0010 (7.6230)	0.0045 (0.0114)	0.0060 (0.0150)	3.0030 (7.6280)
Bore, high pressure	1.5000 (3.8100)	1.5008 (3.8120)	0.0009 (0.0023)	0.0022 (0.0056)	1.5028 (3.8171)
Bores, out-of-round					0.0010 (0.0030)
Crankshaft:					
Journal (rod) size	0.8746 (2.2215)	0.8750 (2.2225)	0.0011 (0.0028)	0.0019 (0.0048)	0.8736 (2.2189)
Taper					0.0010 (0.0030)
Out of round					0.0010 (0.003)
End play			0.0000	0.0020 (0.0050)	0.0020 (0.0050)
Piston to Cylinder:					
Low, pressure, skirt	2.9950 (7.6073)	2.9955 (7.6086)	0.0045 (0.0114)	0.0060 (0.0150)	2.9930 (7.6020)
High pressure, skirt	1.4986 (3.8064)	1.4991 (3.8077)	0.0009 (0.0023)	0.0022 (0.0056)	1.4966 (3.8014)
Piston Ring Gap:					
Low pressure	0.0100 (0.0254)	0.0150 (0.0381)	0.0100 (0.0254)	0.0150 (0.0381)	0.0250 (0.0635)
High pressure	0.0070 (0.0180)	0.0120 (0.0305)	0.0070 (0.0180)	0.0120 (0.0305)	0.0220 (0.0559)

1-12. **Direct and General Support Maintenance Data - continued.**

Table 1-1. Compressor Repair and Replacement Standards (Continued)

Components	Mfr's Dimensions and Tolerances in Inches (cm)		Desired Clearance in Inches (cm)		Maximum Allowable Wear and Clearance in Inches (cm)
	Minimum	Maximum	Minimum	Maximum	
Piston Pin in Rod:					
Low pressure	0.5001 (1.2703)	0.5003 (1.2708)	0.0005 (0.0013)	0.0015 (0.0038)	0.4999 (1.2697)
High pressure	0.5001 (1.2703)	0.5003 (1.2708)	0.0005 (0.0013)	0.0015 (0.0038)	0.4999 (1.2697)
Piston Pin Boss:					
Low pressure	0.4995 (1.2687)	0.5000 (1.2700)	0.0000	0.0000	0.5002 (1.2705)
High pressure	0.4995 (1.2687)	0.5000 (1.2700)	0.0000	0.0000	0.5002 (1.2705)
Connecting Rod Bore:					
Piston pin end	0.5005 (1.2713)	0.5010 (1.2725)	0.0005 (0.0013)	0.0015 (0.0038)	0.5012 (1.2730)
Crankcase end	0.8761 (2.2253)	0.8765 (2.2263)	0.0011 (0.0028)	0.0019 (0.0048)	0.8767 (2.2268)

Section III. TECHNICAL PRINCIPLES OF OPERATION

1-13. Compressor.

The compressor is a two-cylinder, two-stage, air cooled unit. It will deliver 5 cfm of air at 175 psig to the air receiver tank when belt-driven by the gasoline engine running at a speed of 3,600 rpm (revolutions per minute). Filtered air as shown in figure 1-3 is drawn into the low pressure cylinder (the large one) at atmospheric pressure as the piston moves down. Air is compressed when the piston is moving upward, this action closes the inlet valves and opens the outlet valves, through which the air is forced into the intercooler. As the air flows through the intercooler much of the heat of compression is dissipated. The second stage is similar to the first, except the air enters the high pressure cylinder and is recompressed to higher pressure. The air next flows through the aftercooler where it is cooled before passing into the air receiver tank.

1-14. Engine.

The Air Compressor is driven by a Military Standard Model 1A08-III, 1.5 HP gasoline engine. Refer to TM 5-2805-256-14 for a description of the engine.

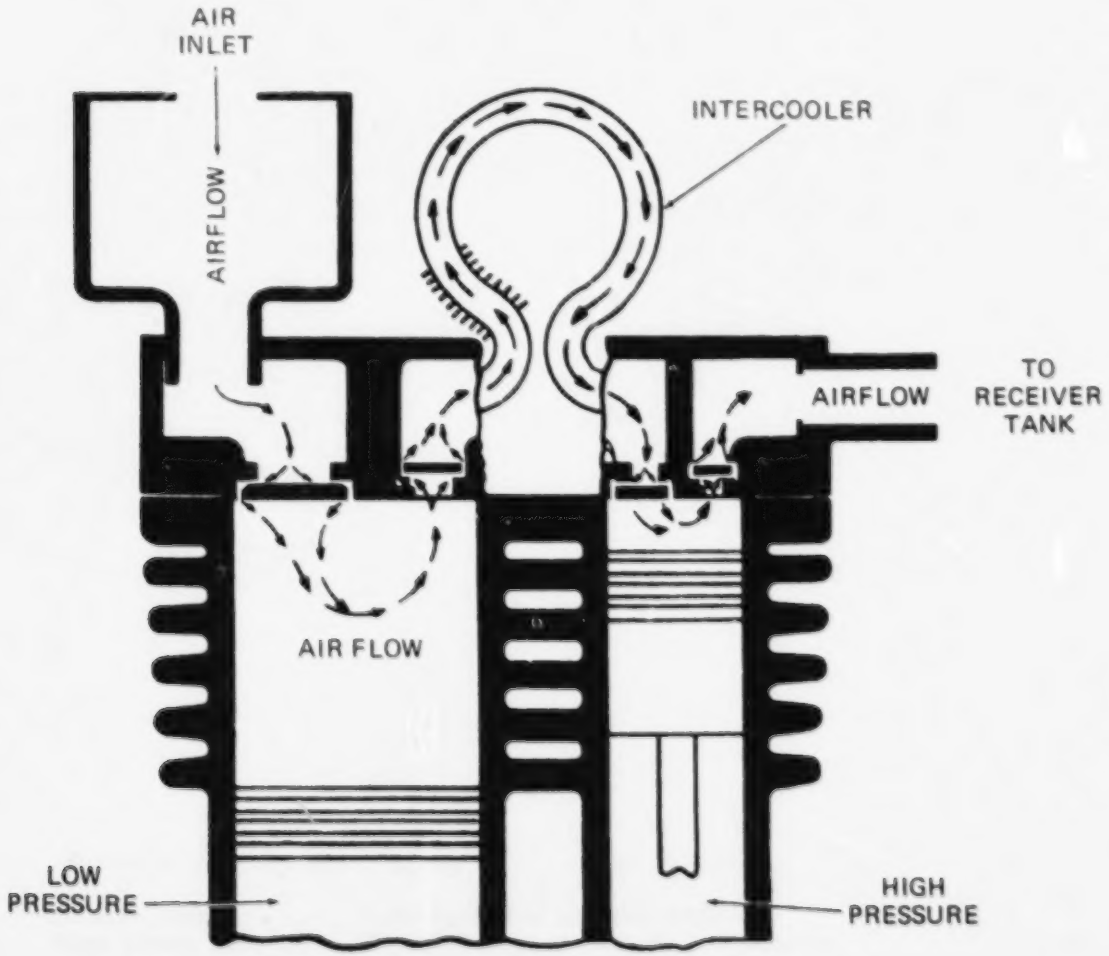


Figure 1-3. Typical two stage compressor.

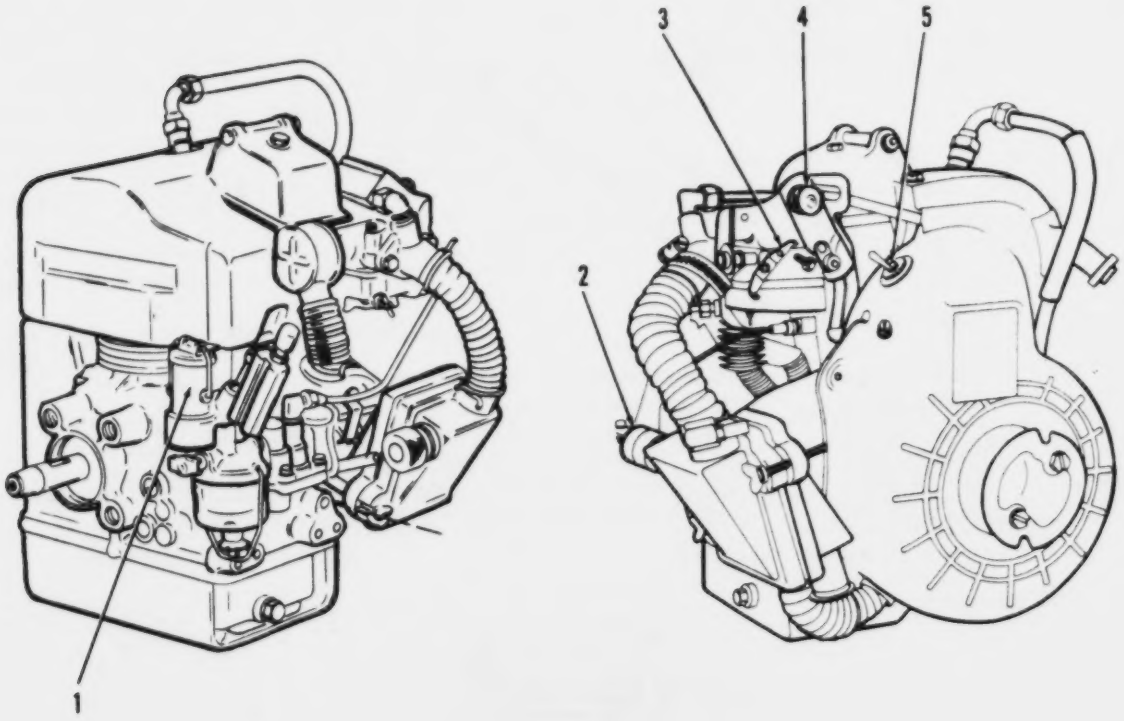
CHAPTER 2

OPERATING INSTRUCTIONS

Section I. DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS

2-1. General. The following paragraphs will show you the controls and indicators you will need to operate the air compressor.

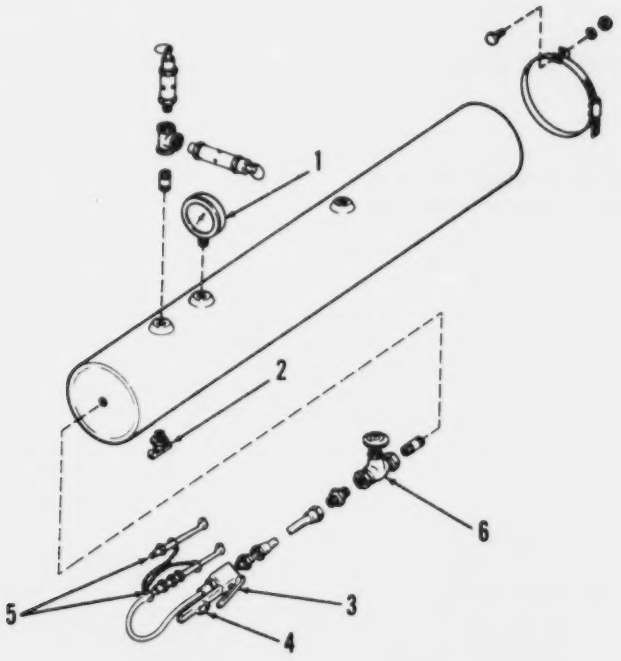
a. Engine.



Key	Control or Indicator	Function
1	Oil Level Indicator	Indicates oil level in engine crankcase
2	Filter Service Indicator	Shows red when air filter needs replacement
3	Choke	Set ON to enrich fuel mixture for cold starting
4	Speed Control	Set to IDLE for warmup and FULL SPEED for normal operation
5	Ignition Switch	Switch to RUN for operation and OFF for stopping the engine

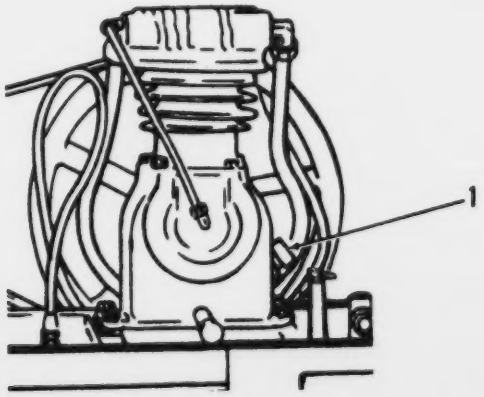
2-1. General - continued.

b. Air receiver System and Air Inflator Gage.



Key	Control or Indicator	Function
1	Pressure Gage	Indicates pressure in the air tank
2	Drain Cock	Used to bleed water and air from the air tank
3	Hand Lever	Releases air from the inflator gage when depressed
4	Pressure Gage	Reads air pressure in the system being pressurized
5	Air Chucks	Used to inflate tires. Two different sizes supplied for different valves
6	Globe Valve	Controls flow of air between the air tank and inflator gage

c. Air Compressor.



1	Oil level gage	Indicates oil level in the crankcase

Section II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

2-2. General.

To ensure that the compressor is ready for operation at all times, it must be inspected systematically so that the defects may be discovered and corrected before they result in serious damage or failure. Defects discovered during operation of the unit shall be noted for future corrections, to be made as soon as an operation has ceased. Stop operation which would damage the equipment if operation were to continue. All deficiencies and shortcomings shall be recorded together with the corrective action taken on DA Form 2404, Equipment Inspection and Maintenance Worksheet, at the earliest opportunity. When performing your Before Operation (B) and During Operation (D) PMCS, always keep in mind the CAUTIONS and WARNINGS. After operation, be sure to perform your (A) PMCS. If your equipment fails to operate, troubleshoot with proper equipment. Report any deficiencies using the proper forms, see TM 38-750.

2-3. Operator/Crew Preventive Maintenance Checks and Services.

Refer to table 2-1 for Preventive Maintenance Checks and Services.

a. Item Number Column. Checks and services are numbered in chronological order regardless of interval. This column will be used as a source of item numbers for the "TM Item Number" column on DA Form 2404 in recording results of PMCS.

b. Interval Columns. The columns headed B, D, A. W and M, will contain a dot (•) opposite the appropriate check indicating it is to be performed Before, During, After, Weekly, or Monthly.

c. Item to be Inspected Column. The items listed in this column are divided into groups and identifies the items to be inspected.

d. Procedures Column. This column contains a brief description of the procedure by which the check is to be performed.

e. For Readiness Reporting, Equipment is Not Ready/Available If: Column. This column will contain the criteria which will cause the equipment to be classified as not Ready/Available because of inability to perform its primary mission.

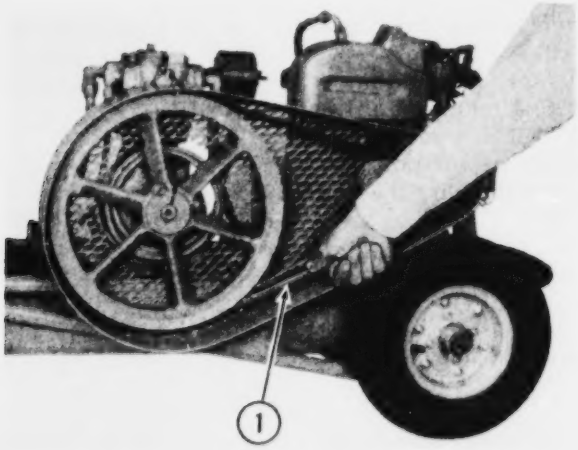
NOTE: If the equipment must be kept in continuous operation, check and service only those items that can be checked and serviced without disturbing operation. Make the complete checks and services when the equipment can be shut down.

2-3. Operator/Crew Preventive Maintenance Checks and Services - continued.

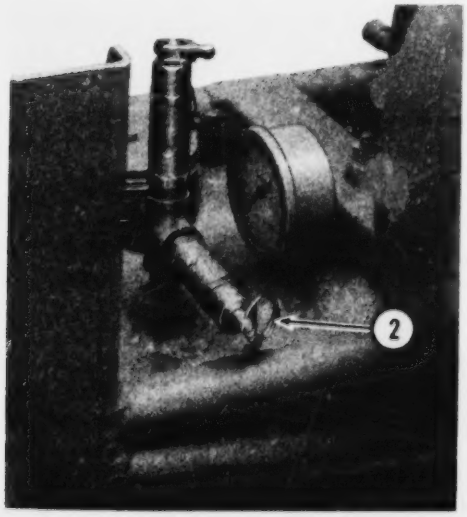
Table 2-1. Preventive Maintenance Checks and Services

NOTE: Within designated interval, these checks are to be performed in the order listed.
B–Before D–During A–After W–Weekly M–Monthly

Item No.	Interval B	D	A	W	M	Item to be Inspected	Procedures Check for and have repaired or adjusted as necessary	For Readiness Reporting, Equipment Is Not Ready/Available If:
1	•		•	•		Drive Belts (1)	Inspect for proper tension. Deflection is 3/4 to 1 inch midway between pulleys. Inspect for crackes or cuts.	Belts are cracked or cut.



2	•		•			Safety Release Valve (2)	Inspect for proper operation. Pull ring to check for freedom of movement.	Release valve leaks air.

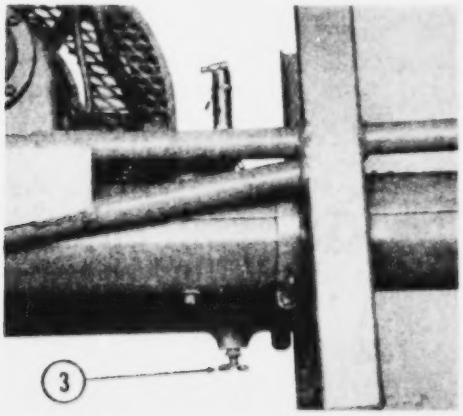


2-3. Operator/Crew Preventive Maintenance Checks and Services - continued.

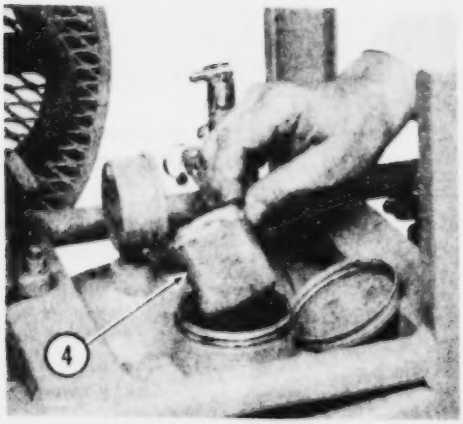
Table 2-1. Preventive Maintenance Checks and Services (Cont)

NOTE: Within designated interval, these checks are to be performed in the order listed.
B—Before D—During A—After W—Weekly M—Monthly

Item No.	Interval B	D	A	W	M	Item to be Inspected	Procedures Check for and have repaired or adjusted as necessary	For Readiness Reporting, Equipment Is Not Ready/Available If:
3	•	•	•			Controls and Instruments	Inspect for damage and insecure mounting. With the unit operating, inspect for proper operation. Normal operating pressure is 140-175 psi (9.8-12.3 kg/sq cm).	Controls are damaged or loose.
4	•		•			Air Receiver Draincock (3)	Open draincock to drain water from the tank.	



5	•	•	•			Fuel Tank	Check fuel level and fuel strainer sediment bowl (4).	

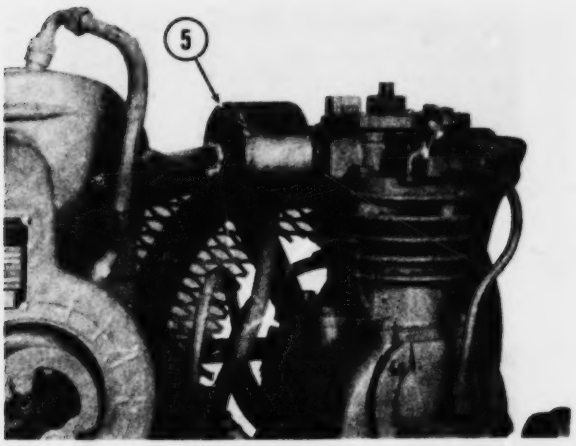


2-3. Operator/Crew Preventive Maintenance Checks and Services - continued.

Table 2-1. Preventive Maintenance Checks and Services (Cont)

NOTE: Within designated interval, these checks are to be performed in the order listed.
B—Before D—During A—After W—Weekly M—Monthly

Item No.	Interval B	D	A	W	M	Item to be Inspected	Procedures Check for and have repaired or adjusted as necessary	For Readiness Reporting, Equipment Is Not Ready/Available If:
6	•		•			Air Compressor Crankcase	Check oil level. Service as required. See figure 3-1.	Oil level is low.
7	•		•			Engine	Check oil level. Add oil as indicated by gage. See figure 3-2.	Oil level is low.
8		•				Compressor	During operation observe for any unusual noise or vibration.	Compressor runs noisy.
9				•		Air Cleaner (5)	Inspect for insecure mounting and internal obstructions. Service. See para. 3-9c.	Air cleaner element is clogged.



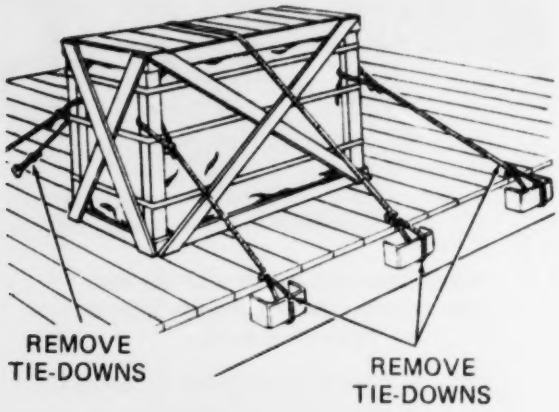
10				•		Tires and Tubes	Check air pressure. Proper pressure is 25 psi (1.8 kg/sq cm).	

Section III. OPERATION UNDER USUAL CONDITIONS

2-4. Assembly and Preparation for Use.

a. Unloading.

(1) Remove all tiedowns or blocking that secure the crate to the carrier.



WARNING: Make certain any lifting device used has a capacity equal to or greater than the weight being lifted. Failure to observe this precaution could result in injury or death to personnel and damage to equipment.

(2) A forklift truck, pipe rollers, or a suitable hoist must be used when removing the air compressor from the carrier.

b. Unpacking.

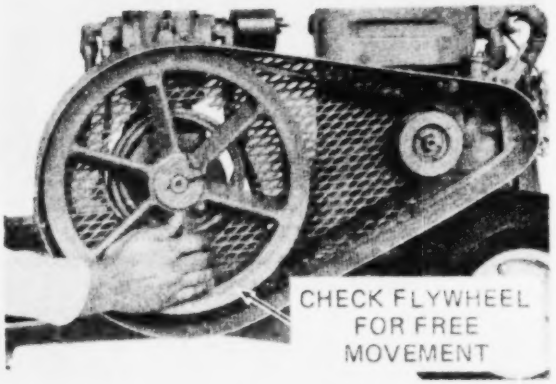
(1) Place the air compressor as close to the point of use as possible. Remove the box containing the air hose assembly and inflation device from the inside of the crate.

(2) Prepare the air compressor for inspection and servicing as outlined on DA Form 2258, Depreservation Guide, attached on or near the operational controls.

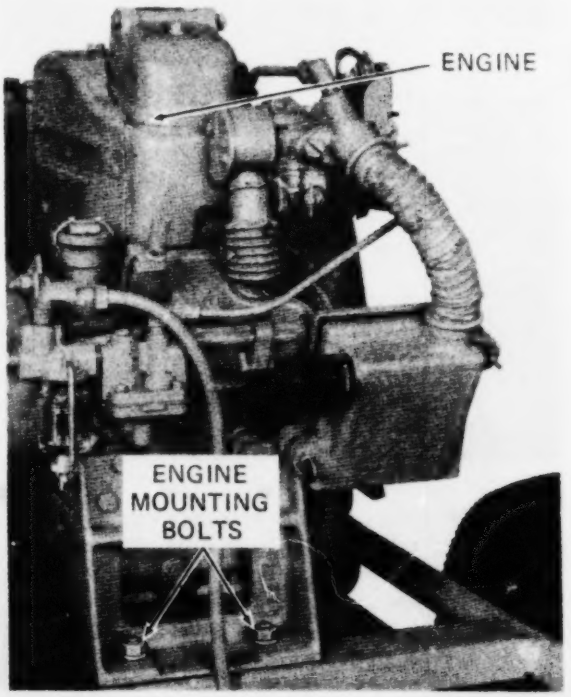
(3) Remove the nuts and lockwasher that secure the air compressor to the bottom of the crate and remove the air compressor.

c. Inspection and Service.

(1) Make a complete visual inspection of the air compressor for any loss or damage that may have occurred during shipment. See that flywheel pulley turns freely by hand. If shipping crate has been damaged, pay particular attention to the compressor areas adjacent to damage areas of the crate.

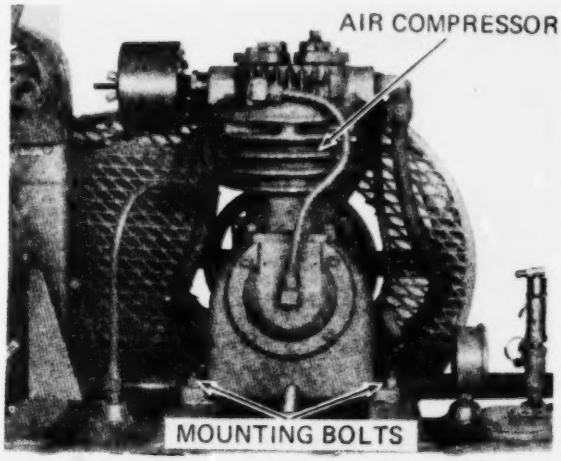


(2) Inspect the engine for loose connections, and insecure mounting.

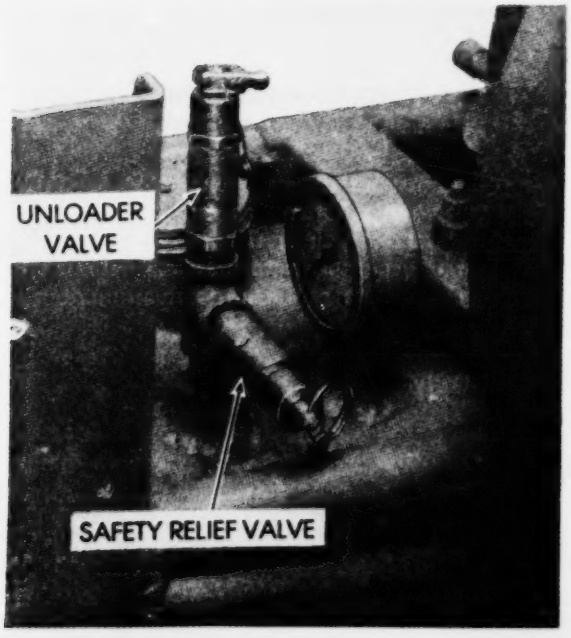


2-4. Assembly and Preparation for Use - continued.

(3) Inspect the air compressor for loose mounting bolts, cracks, breaks and other defects.

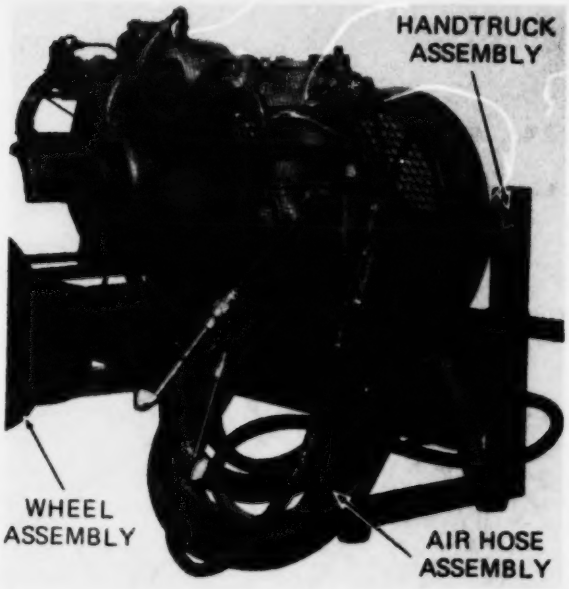


(4) Inspect the unloader and safety relief valve for loose mounting.



(5) Inspect the handtruck assembly for cracks, breaks and other damage.

(6) Inspect the wheel assemblies for cracks, breaks, insecure mounting and alignment.



(7) Check the contents of the crate against the packing list to make sure no items are missing.

(8) Correct all deficiencies or report them to the proper authority.

d. Installation. The portable air compressor is delivered with an air hose assembly and gage inflator. The air hose assembly is installed directly in the end of the air receiver tank.

e. Outdoor Installation. Avoid muddy, sandy or dusty locations as a site for operation as dirt and moisture shorten the life of all moving parts.

f. Indoor Installation. If the compressor is to be operated within a building or vehicle, pipe the engine exhaust to the outside. Use as few bends as possible in the exhaust line and make sure all connections are tight.

g. Noise Hazard and Warning Signs. Signs conforming to provisions of AR 385-30 will be erected in the area to provide notification of noise hazard in accordance with TB MED-251. The signs should read:

WARNING

NOISE HAZARD EQUIPMENT

HEARING PROTECTION

REQUIRED

2-5. Operating Procedure

a. General. The operator must know how to perform every operation of which the air compressor is capable. This section gives instructions on starting and stopping the air compressor, basic motions of the air compressor, and on coordinating basic motions to perform specific tasks for which the equipment is designed. Since nearly every job presents a different problem, the operator may have to vary given procedures to fit the individual job.

WARNING: Operation of this equipment presents a noise hazard to personnel in the area. The noise level exceeds the allowable limits for unprotected personnel. Wear ear muffs or earplugs which were fitted by a trained professional.

WARNING: Do not use this compressor for charging cylinders that require breathable air.

b. Preparation for Starting. Perform the necessary Before Operation Preventive Services as indicated in table 2-1.

c. Starting.

(1) Turn ignition switch (1) on.

(2) Open draincock (2).

(3) Close choke lever (3).

(4) Raise the release valve (4) to unload compressor.

(5) Wind starter rope clockwise around starter pulley (5).

(6) With a quick, steady pull, start the engine.

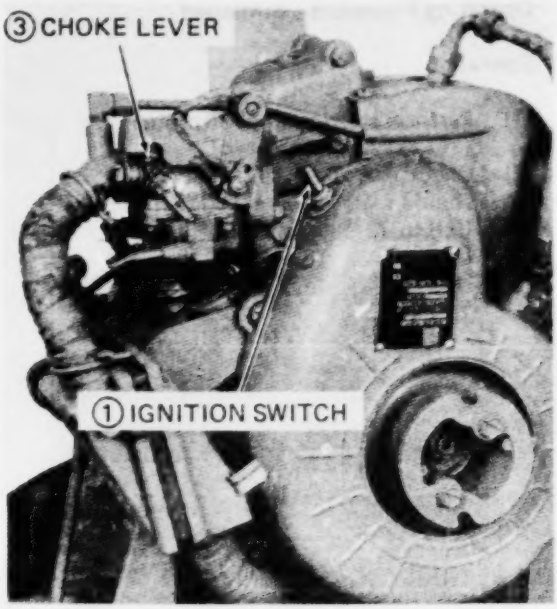
(7) When engine starts, gradually open choke lever (3).

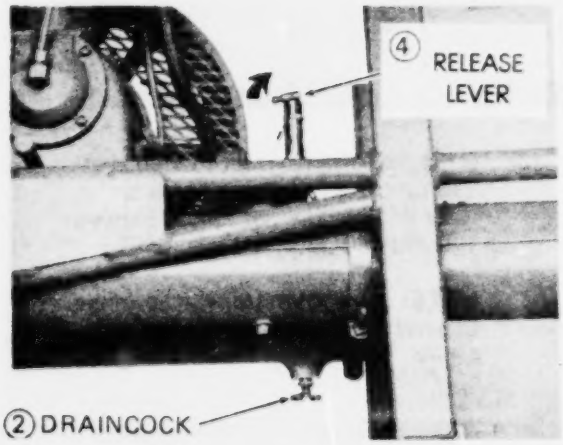
(8) Place release lever (4) in down position.

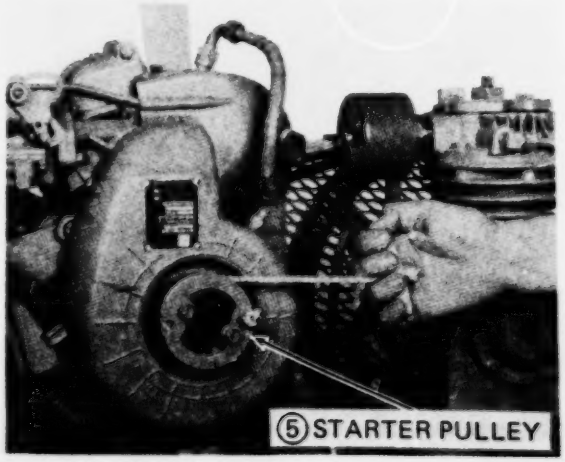
(9) Close draincock (2).

(10) Perform the necessary During Operation Preventive Services as indicated in table 2-1.

(11) Watch for any ususual noise or vibration.





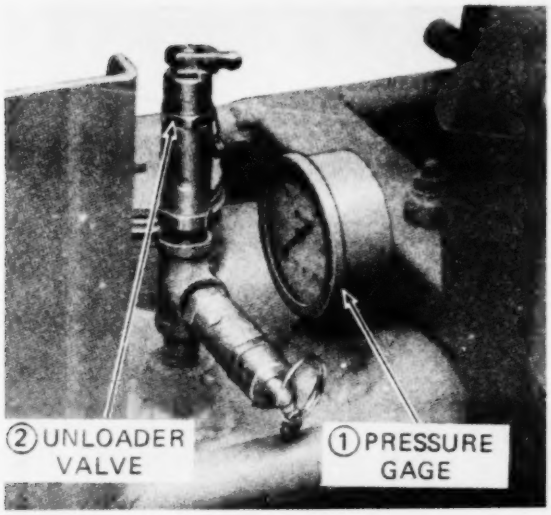


2-5. Operating Procedure - continued.

d. Operation.

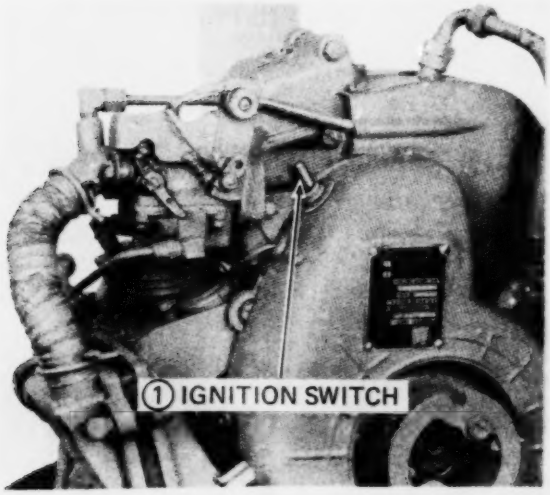
(1) Perform starting steps 1 through 11.

(2) Check pressure gage (1) reading. It should read between 140 to 175 psi (9.8 to 12.3 kg/sq cm).



(3) Unloader valve (2) is set to unload at 175 psi (12.3 kg/sq cm). Replace valve if valve does not unload between 170 and 180 psi

NOTE: Air compressor will continue to cycle as long as fuel is fed to the engine.



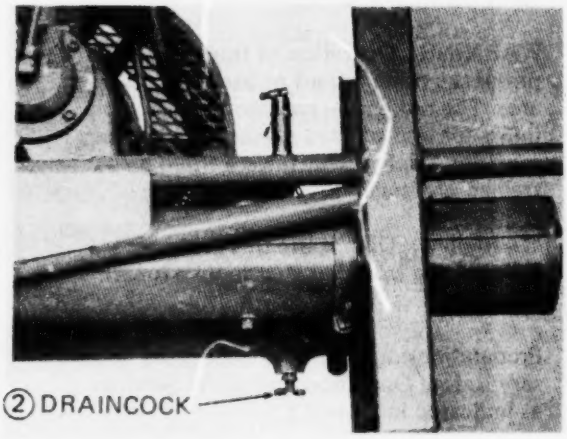
e. Stopping.

(1) Turn ignition switch (1) off.

(2) Open draincock (2) to blow air and condensate from tank.

(3) Close draincock.

(4) Perform the necessary After Operation Preventive Services as indicated in table 2-1.



2-6. Preparation for Movement

a. Operate the compressor and allow the pressure in the air receiver tank to build to approximately 100 psi (7.03 kg/sq cm).

b. Stop the engine. Open the draincock and blow the condensate from air tank. Close the draincock.

c. Drain Fuel Strainer.

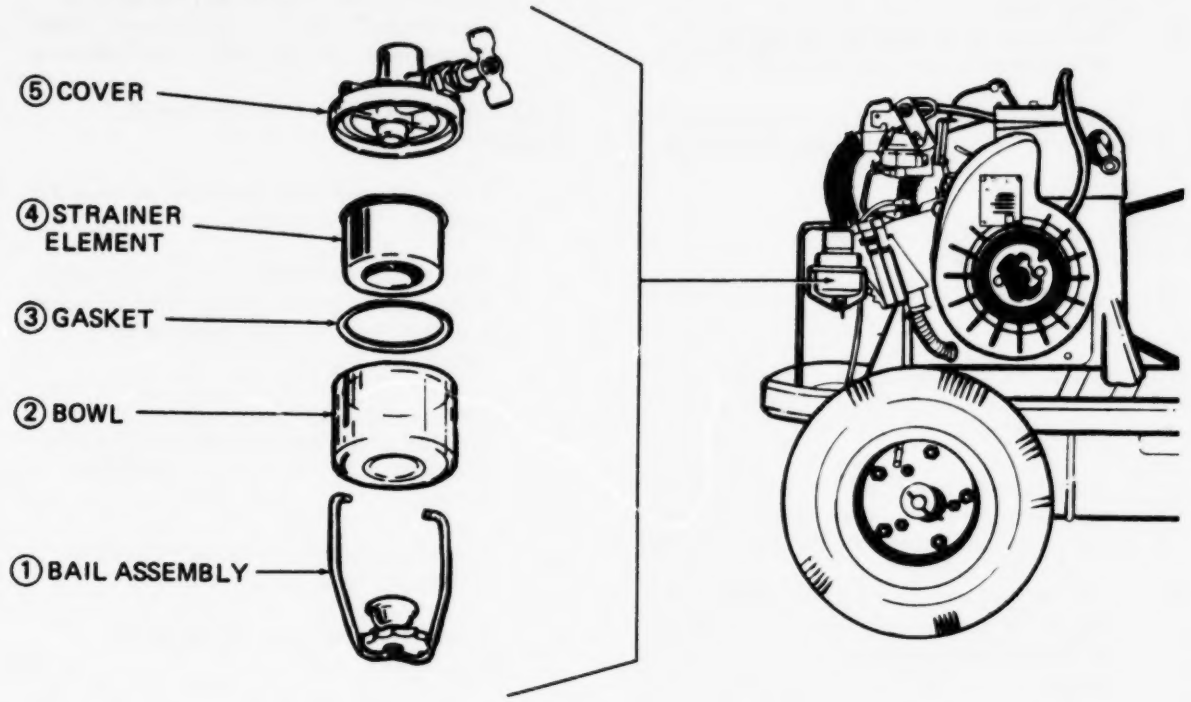
(1) Loosen the nut at the base of the fuel strainer bowl retaining bail assembly (1).

(2) Swing the bail to one side and carefully lower the bowl (2) together with gasket (3) and strainer (4). Empty the bowl and discard gasket.

(3) Position strainer (4) in recess of cover (5) then place new gasket (3) and bowl (2) over strainer.

(4) Swing cup of bail assembly (1) beneath bowl and secure with nut at base.

2-6. Preparation for Movement - continued.



d. Drain fuel tank into a suitable container.

e. Remove the air hose assembly from the air receiver tank. Cover the hose connector in the air receiver tank.

f. Lift the air compressor and accessories on a suitable carrier and block and tie it down.

g. Move the air compressor to a new worksite.

Section IV. OPERATION UNDER UNUSUAL CONDITIONS

2-7. Operation in Extreme Cold (Below 0°F (-18°C))

a. Locate the air compressor in a shed or building whenever possible. If the unit is operated outdoors, protect it from prevailing winds and cover it with a tarpaulin when not in use.

b. Lubricate the air compressor in accordance with figure 3-1.

c. Avoid excessive handling, kinking, and sharp bending of the air hose, which will become brittle at low temperature.

d. Keep all fuel tanks and storage containers filled with fuel to prevent formation of ice crystals from the freezing of condensate. Such crystals will clog fuel lines and carburetor jets. Use filter paper, chamois, or other type strainer when filling the fuel tank or transferring fuel from one container to another.

WARNING: Always provide a metallic contact between the fuel container and the fuel tank. This will prevent a spark from being generated as the gasoline flows over metallic surfaces.

2-7. Operation in Extreme Cold (Below 0°F (-18°C)) - continued.

e. Allow engine to reach normal operating temperature before applying load.

f. For additional information on operation in extreme cold conditions refer to FM 9-207.

2-8. Operation in Extreme Heat

a. Lubricate the air compressor in accordance with figure 3-1.

b. Check the drive-belt tension frequently. Improper drive-belt tension often results in over-heating.

c. Locate the air compressor in an operating area that is well ventilated or provide intake and exhaust fans to ventilate in closed areas.

d. Fill the fuel tank at the end of each day's operation, especially in areas where the temperature drops sharply at night. This will prevent condensation from forming in the fuel tank.

e. Keep the engine clean. Service the engine air cleaner as often as necessary.

2-9. Operation in Dusty or Sandy Areas

a. Lubricate the air compressor in accordance with figure 3-1, making sure that all lubrication points are free from dirt and sand before applying lubricant. Keep all lubricant containers clean and tightly closed. Do not lubricate excessively as dirt and sand will adhere to excess lubricant and may work into moving parts. Wipe off all lubrication points after lubricating.

b. Protect the air compressor from dust with screens, shelters, built from tarpaulin, or other dustproof material. Keep the unit covered when not in use.

c. Clean the compressor air cleaner more often than when operating under normal conditions.

d. Take adequate precautions to prevent sand and dirt from entering the fuel tank. Service the fuel strainer as often as necessary to keep the bowl free from dirt or sand. Clean the engine air cleaner more often than usual.

2-10. Operation Under Rainy or Humid Conditions.

a. Protect the unit with a shelter, keeping the sides open for ventilation.

b. Make sure all surfaces requiring lubrication are clean and dry before applying lubricant. Lubricate the unit in accordance with figure 3-1.

c. Coat exposed polished or machined metal surfaces with a suitable rustproof material after first removing any accumulations of rust.

d. Open the draincock frequently to blow condensate from the air receiver tank.

e. Service the engine air cleaner more frequently.

2-11. Operation in Salt Water Areas.

a. Wipe the unit dry at frequent intervals, with particular emphasis on the engine.

b. If the unit becomes encrusted with salt, wash it with fresh water, taking care not to damage the electrical system with water.

c. Make sure all surfaces requiring lubrication are clean and dry before applying lubricant. Lubricate the unit in accordance with figure 3-1.

d. Coat exposed polished or machined metal surfaces with a suitable rustproof material after first removing any accumulation of rust.

2-12. Operation at High Altitudes.

The air compressor is designed to operate efficiently at elevations up to 5,000 feet. There will be a reduction in efficiency because of the rarified air at this level. This is a normal condition that cannot be prevented.

CHAPTER 3

OPERATOR'S MAINTENANCE INSTRUCTIONS

Section I. LUBRICATION INSTRUCTIONS

3-1. General Lubrication Information

This section contains lubricating instructions for the air compressor and a reproduction of the lubrication order for the engine LO 5-2805-256-12 (figure 3-2).

3-2. Air Compressor Lubrication

a. Refer to figure 3-1 for lubrication points and lubricant specifications.

b. Intervals and related task-hour times are based on normal hours of operation. The task-hour time specified is the time you need to do all the services prescribed for a particular interval. Change the interval if your lubricants are contaminated or if you are operating the equipment under adverse operating conditions, including longer-than-usual operating hours. You may extend the interval during periods of low activity, but you must take adequate preservation precautions.

WARNING: Drycleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact by wearing rubber or solvent impermeable gloves when handling the solvent or material wet with drycleaning solvent. Wash hands immediately after exposure with soap and water and use a lanolin based skin cream to prevent skin drying. Do not use near open flame or excessive heat. Flash point of solvent is 100°F (38°C). Ensure that ventilation adequate to reduce solvent vapor concentrations below acceptable threshold limit values is provided.

c. Clean fittings before lubricating. Relubricate all areas exposed to water after amphibious operation. Lubricate points indicated by dotted arrow shaft on both sides of equipment. Clean parts with SOLVENT, dry cleaning, or with OIL, fuel, diesel. Dry before lubricating. Drain crankcases when HOT. Fill and check level.

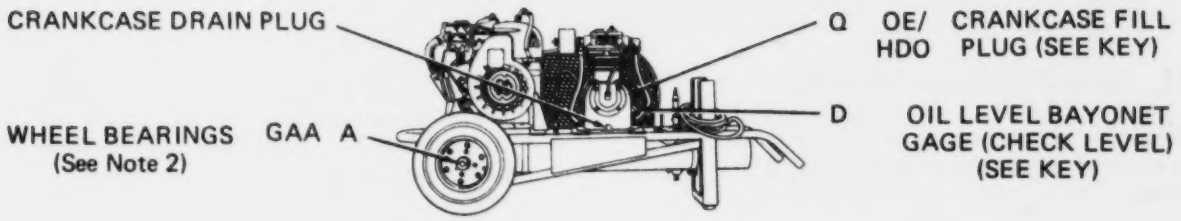
3-3. Engine Lubrication.

Refer to figure 3-2 for lubrication procedures.

3-3. Engine Lubrication - continued.

LUBRICANT • INTERVAL

INTERVAL • LUBRICANT


CRANKCASE DRAIN PLUG
WHEEL BEARINGS (See Note 2)
GAA A
Q OE/HDO CRANKCASE FILL PLUG (SEE KEY)
D OIL LEVEL BAYONET GAGE (CHECK LEVEL) (SEE KEY)

*TOTAL TASK HOURS		*TOTAL TASK HOURS	
INTERVAL	TASK-HOURS	INTERVAL	TASK-HOURS
D	0.5	Q	0.5
W	0.5	A	1.5

-KEY-

LUBRICANTS	CAPACITY	EXPECTED TEMPERATURES			FOR ARCTIC OPERATION Refer to TM 9-207	INTERVALS
		Above +32°F Above 0°C	+40°F to -10°F + 5°C to -23°C	0°F to -65°F -18°C to -50°C		
OE/HDO OIL, Engines, Heavy Duty (MIL-L-2104C) Crankcase	1 qt. .946 liters	OE/HDO 30	OE/APG-PD-1	OEA/APG-PG-1		D 10 Hours or Daily W 50 Hours Q 250 Hours or Quarterly A 1000 Hours or Annually
OEA/APG-PD-1 Oil Engine Sub Zero						
SD2 Solvent CP-D-680 dry cleaning						

NOTES:

1. FOR OPERATION OF EQUIPMENT IN PROTRACTED COLD TEMPERATURES BELOW -10°F -23°C. Remove lubricants prescribed in the key for temperatures above -10°F -23°C. Clean parts with SOLVENT dry-cleaning (P-D-680). Relubricate with lubricants specified in the key for temperatures below -10°F -23°C.

2. WHEEL BEARINGS. Every 1000 hours remove wheels, clean and inspect all parts, replace damaged or worn parts, repack bearings, and reassemble.

Figure 3-1. Compressor lubrication.

3-3. Engine Lubrication - continued.

LUBRICATION ORDER

TO 38G2-102-2LC-1

LO5-2805-256-12

21 February 1977 (Supersedes LO 5-2805-256-12, 18 Feb 1972)

ENGINE, GASOLINE, 1-1/2 HP, MILITARY STANDARD MODELS (MODEL 1A08-1) (MODEL 1A08-2) (MODEL 1A08-3)

Reference: TM 5-2805-256-14 AND FEDERAL SUPPLY CATALOG C9100-IL

Intervals and related task-hours times are based on normal hours of operation. The task-hour time specified is the time you need to do all the services prescribed for a particular interval. Change the interval if your lubricants are contaminated or if you are operating the equipment under adverse operating conditions, including longer than-usual operating hours. You may extend the interval during periods of low activity, but you must take adequate preservation precautions.

*The time specified is the time required to perform all services at the particular interval.

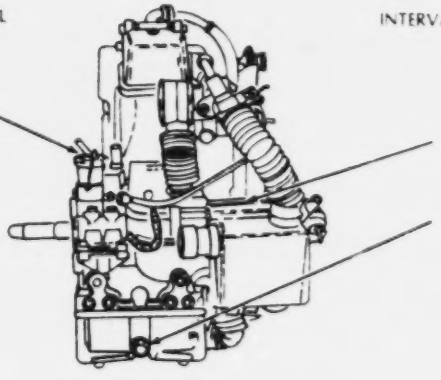
Clean fittings before lubricating. Relubricate all areas exposed to water after amphibious operation. Lubricate points indicated by dotted arrow shaft on both sides of equipment. Clean parts with SOLVENT, dry cleaning, or with OIL, fuel, diesel. Dry before lubricating. The level of maintenance authorized to lubricate a point is indicated by the following: (C) operator/crew. You can improve this publication by calling attention to errors and by recommending improvements and by stating your reasons for the recommendations. Your letter or DA Form 2028 (Recommended Changes to Publications and Forms) should be mailed directly to Commander, US Army Troop Support Aviation and Materiel Readiness Command, ATTN: DRSTS-MTPS, 4300 Goodfellow Blvd., St. Louis, MO 63120. A reply will be furnished directly to you.

FOLD

FOLD

LUBRICANT • INTERVAL

Crankcase Fill and Level (Check level) (See key) CAUTION: When OES oil is used the level will be checked more often. — OE/HDO — D



INTERVAL • LUBRICANT

S — OE/HDO — Ignition Cam Wick (Sparingly)

W — Crankcase Drain (Drain and refill)

*TOTAL TASK HOURS	
INTERVAL	TASK HOURS
D	0.5
W	1.5

*TOTAL TASK HOURS	
INTERVAL	TASK HOURS
S	0.5

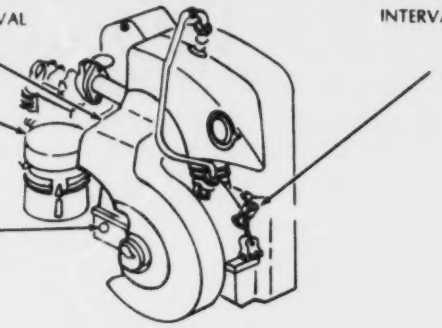
CARD 1 OF 2

Figure 3-2. Lubrication order, engine (Card 1 of 2).

3-3. Engine Lubrication - continued.

LUBRICANT • INTERVAL

Ignition cam wick (Sparingly)	OE/ HDO	S
Air Cleaner (Refill oil reservoir to level mark, every 50 hours disassembly entire unit, clean recil and reassemble)	OE/ HDO	D
Crankcase Drain (Drain and refill)		W



INTERVAL • LUBRICANT

D	OE/ HDO	Crankcase Fill and Level (Check level) (See key)

MODELS 1A08-1 AND 1A08-2

KEY

LUBRICANTS	CAPACITY	EXPECTED TEMPERATURES Above +32°F Above 0°C	+40°F to 10°F + 5°C to -23°C	0°F to -65°F -18°C to -50°C	FOR ARCTIC OPERATIONS REFER TO TM 9-207	INTERVALS
OE/HDO LUBRICATING (MIL-L-2104C OIL, ENGINE		OE/HDO 30	OEA/APG-PD-1	OEA/APG-PD-1		D- 8 hours or daily
CRANKCASE 1 1/2 HP	1/2 qt. or 4731 liters					W- 50 hours
AIR CLEANER 1 and 11 only	1/8 qt or 1182 liters					S- 500 hours or semi-annually
OEA/APG-PD-1 OEA, OIL, ENGINE SUB-ZERO						

FOLD FOLD

NOTES
1 FOR OPERATION OF EQUIPMENT IN PROTRACTED COLD TEMPERATURES BELOW -10°F(-23°C). Remove lubricants prescribed in the key for temperatures above -10°F(-23°C).

Copy of this Lubrication Order will remain with the equipment at all times; instructions contained herein are mandatory.

BY ORDER OF THE SECRETARIES OF THE ARMY AND THE AIR FORCE:

BERNARD W. ROGERS
General, United States Army
Chief of Staff

OFFICIAL:

PAUL T. SMITH
Major General, United States Army
The adjutant General

DAVID C. JONES, General, USAF
Chief of Staff

OFFICIAL:

JAMES J. SHEPARD, Colonel, USAF
Director of Administration

CARD 2 of 2

Figure 3-2. Lubrication order, engine (Card 2 of 2).

Section II. TROUBLESHOOTING

3-4. General.

a. This section contains troubleshooting information for locating and correcting most of the operating troubles which may develop in the air compressor. Each malfunction for an individual component, unit, or system is followed by a list of tests or inspections which will help you to determine corrective actions to take. You should perform the tests/inspections and corrective actions in the order listed.

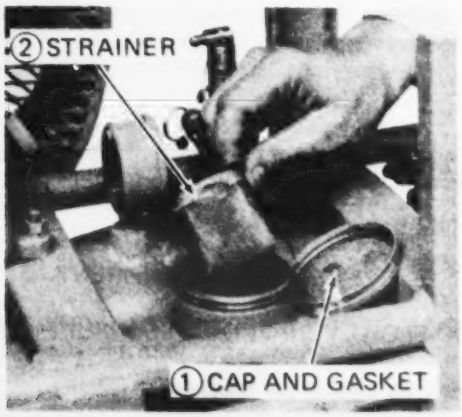
b. This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor.

3-5. Operator Troubleshooting.

Perform troubleshooting functions in accordance with table 3-2.

Table 3-2. Troubleshooting

Malfunction Test or Inspection Corrective Action
ENGINE
1. ENGINE FAILS TO START.
Step 1. Inspect for lack of fuel in fuel tank.
Fill fuel tank.
Step 2. Check that engine ignition switch is switched to on.
Turn ignition switch on.
Step 3. Inspect fuel tank strainer for signs of dirt or grime which could pass into fuel lines.
a. Unscrew fuel tank cap and remove cap and gasket (1).
b. Lift out tank strainer (2) taking care that any particles in the strainer are not dislodged and allowed to fall into the tank. Service fuel tank strainer.



3-5. Operator Troubleshooting - continued.

Table 3-2. Troubleshooting (cont)

Malfunction
Test or Inspection
Corrective Action

1. ENGINE FAILS TO START. (cont)

WARNING: Drycleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact by wearing rubber or solvent impermeable gloves when handling the solvent or material wet with drycleaning solvent. Wash hands immediately after exposure with soap and water and use a lanolin based skin cream to prevent skin drying. Do not use near open flame or excessive heat. Flash point of solvent is 100°F (38°C). Ensure that ventilation adequate to reduce solvent vapor concentrations below acceptable threshold limit values is provided.

(1) Clean the tank strainer (2) with dry cleaning solvent, P-D-680. Dry thoroughly.

(2) Position strainer in fuel tank filler aperture.

(3) Install fuel tank cap and gasket (1).

2. ENGINE MISSES OR OPERATES ERRATICALLY.

Step 1. Inspect fuel tank cap vent for blockage.

Clean cap vent.

3. ENGINE OVERHEATS.

Step 1. Inspect belt guard screen for obstruction.

With the engine stopped, clear obstruction from screen.

Step 2. Restricted cylinder cooling fins.

Clean cylinder cooling fins.

4. ENGINE STOPS.

Step 1. Inspect for lack of fuel in fuel tank.

Fill fuel tank.

PNEUMATIC EQUIPMENT

1. COMPRESSOR PUMPS TOO SLOWLY OR PROVIDES INSUFFICIENT PRESSURE.

Step 1. Inspect compressor air cleaner for blockage.

3-5. Operator Troubleshooting - continued.

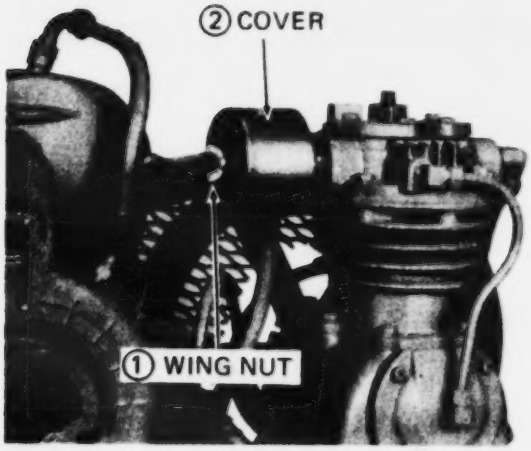
Table 3-2. Troubleshooting (Cont)

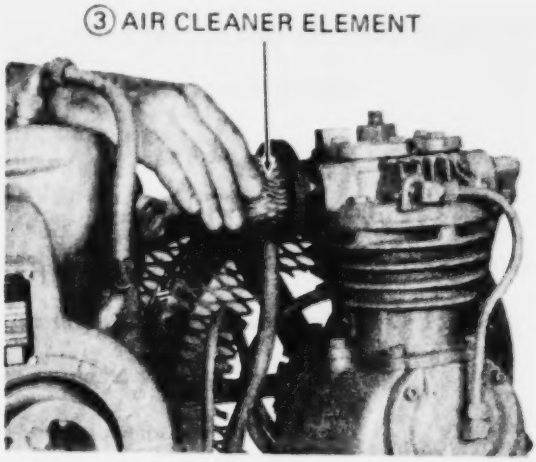
Malfunction
Test or Inspection
Corrective Action

1. COMPRESSOR PUMPS TOO SLOWLY OR PROVIDES INSUFFICIENT PRESSURE. (cont)

a. Position ignition switch to OFF to stop engine.

b. Remove wingnut (1) and air cleaner cover (2).





c. Lift out air cleaner element (3) and check for dirt. Service the air cleaner.

WARNING: Drycleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact by wearing rubber or solvent impermeable gloves when handling the solvent or material wet with drycleaning solvent. Wash hands immediately after exposure with soap and water and use a lanolin based skin cream to prevent skin drying. Do not use near open flame or excessive heat. Flash point of solvent is 100°F (38°C). Ensure that ventilation adequate to reduce solvent vapor concentrations below acceptable threshold limit values is provided.

WARNING: When using compressed air for blowing, air hose pressure must not exceed 30 psig, and individuals must wear eye protective equipment.

(1) Clean the air cleaner with cleaning solvent, P-D-680, and dry thoroughly.

(2) Clean filter element by blowing out with air or washing with cleaning solvent, P-D-680.

(3) Inspect the air cleaner for cracks, dents, breaks, and other damage.

3-5. Operator Troubleshooting - continued.

Table 3-2. Troubleshooting (Cont)

Malfunction
Test or Inspection
Corrective Action

1. COMPRESSOR PUMPS TOO SLOWLY OR PROVIDES INSUFFICIENT PRESSURE. (cont)

(4) Replace defective filter element or the complete cleaner assembly as required.

(5) Install cover (2) with wingnut (1).

Step 2. Check for leaks from air receiver tank fittings with soapy water.

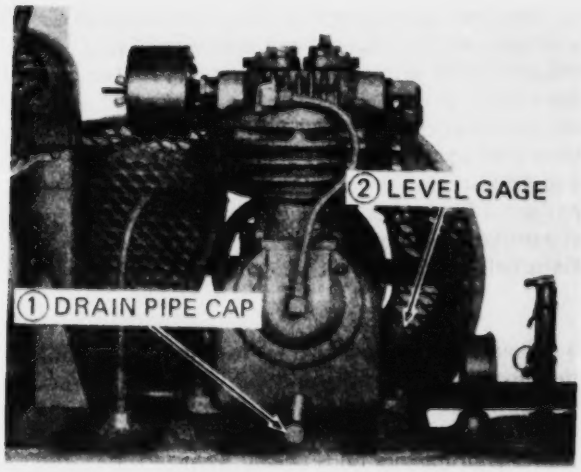
Secure fittings as necessary.

2. EXCESSIVE COMPRESSOR OIL CONSUMPTION.

Step 1. Check for incorrect or inferior grade of compressor oil.

Replace compressor crankcase oil.

a. Position suitable container beneath compressor crankcase drain pipe and remove cap (1) from pipe.



b. Install drain cap (1) when oil is completely drained.

c. Remove combined oil filler plug and bayonet type level gage (2).

3-5. Operator Troubleshooting - continued.

Table 3-2. Troubleshooting (Cont)

Malfunction
Test or Inspection
Corrective Action

2. EXCESSIVE COMPRESSOR OIL CONSUMPTION. (cont)

d. Fill crankcase with 1 quart (0.94 liters) of correct type of oil as follows:

Expected Temperature	Oil Type
Above 32°F. (0°C.)	OE 10
+40°F. (4.5°C.) to -10°F. (-23°C.)	OE 30
0°F. (-18°C.) to -65°F. (-54°C.)	OES

e. Install oil filler level gage after checking oil level.

Step 2. Inspect for signs of leaks from oil line or fitting.

Secure oil line or fitting.

3. COMPRESSOR OVERHEATING.

Step 1. Inspect for dirt in cooling coils and cylinder fins.

Blow out any dirt with compressed air.

Step 2. Check for poor ventilation and high room temperature.

If possible, move compressor to a more adequately ventilated area or check the possibility of piping air intake from a cooler location.

4. NOISY COMPRESSOR OPERATION.

Step 1. Check compressor for insufficient oil.

Fill compressor crankcase with correct oil as follows:

Expected temperature	Oil Type
Above 32°F. (0°C.)	OE 10
+40°F. (4.5°C.) to -10°F. (-23°C.)	OE 30
0°F. (-18°C.) to -65°F. (-54°C.)	OES

Section III. MAINTENANCE PROCEDURES

3-6. General.

Instructions in this section are published for the information and guidance of the operator to maintain the air compressor.

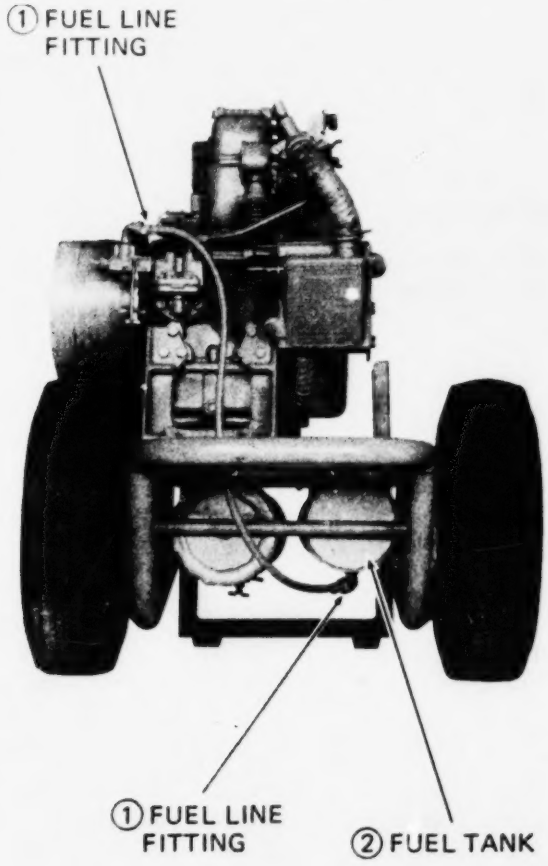
3-7. Fuel Tank, Lines and Fittings.

a. Check all fittings (1) for leaks and tighten if necessary.

b. Check cover gasket for leaks and replace if necessary.

c. If leak is found in fuel tank (2), report to higher authority.

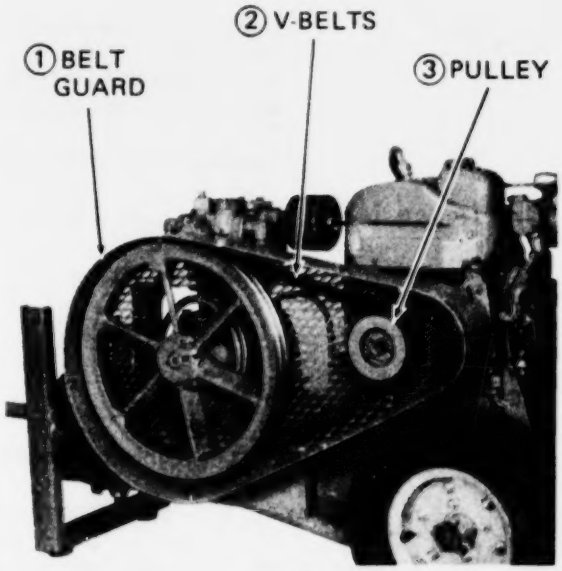
d. Clean fuel tank strainer.



3-8. Belt Guard, V-Belts and Pulley.

a. Inspect the belt guard (1) for dents, cracks, or other damage. Straighten minor dents and bends in the guard.

b. Inspect all attaching hardware for damaged threads.



c. Inspect the V-belts (2) for cuts, fraying and wear.

d. Inspect the pulley (3) for cracks or looseness.

3-9. Air Cleaner and Oil Filler.

a. Removal.

(1) Stop the engine.

(2) Remove the compressor air cleaner from the cylinder head by turning counterclockwise.

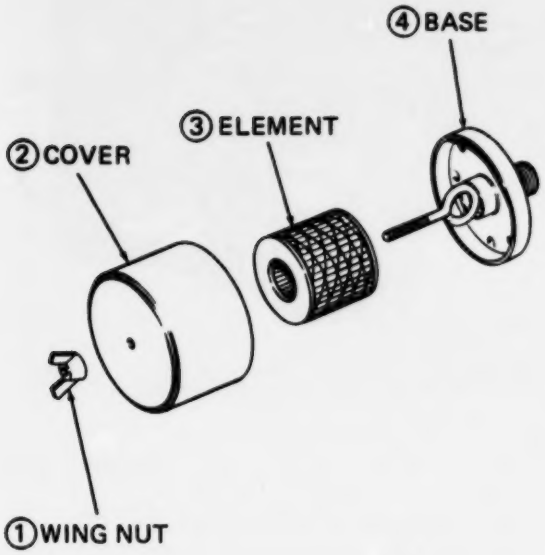
(3) Remove the oil level gage from the compressor crankcase.

3-9. Air Cleaner and Oil Filler - continued.

b. Disassembly.

(1) Remove wing nut (1) and cover (2).

(2) Remove element (3) from the base (4).



c. Cleaning and Inspection.

WARNING: Drycleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact by wearing rubber or solvent impermeable gloves when handling the solvent or material wet with drycleaning solvent. Wash hands immediately after exposure with soap and water and use a lanolin based skin cream to prevent skin drying. Do not use near open flame or excessive heat. Flash point of solvent is 100°F (38°C). Ensure that ventilation adequate to reduce solvent vapor concentrations below acceptable threshold limit values is provided.

WARNING: When using compressed air for blowing, air hose pressure must not exceed 30 psig, and individuals must wear eye protective equipment.

(1) Clean the air cleaner with cleaning solvent, P-D-680, and dry thoroughly.

(2) Clean filter element (3) by blowing out with air or washing with cleaning solvent, P-D-680.

(3) Inspect the air cleaner for cracks, dents, breaks, and other damage.

(4) Replace defective filter element (3) or the complete cleaner assembly if required.

(5) Inspect the oil level gage for cracks or breaks.

(6) Replace the oil level gage if defective.

d. Reassembly and Installation.

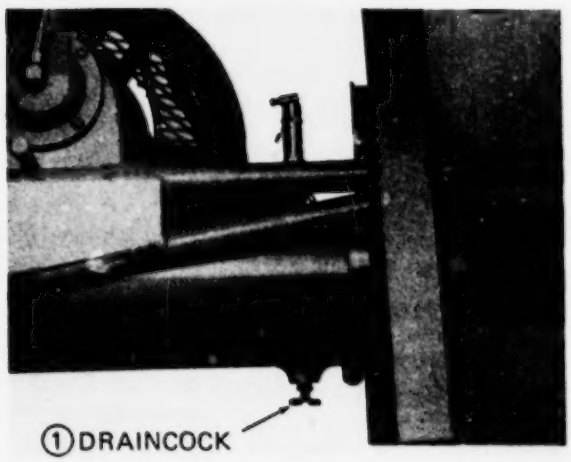
(1) Install the filter element (3) and cover (2) into base (4) and fastening with wing nut (1).

(2) Screw the air cleaner back into the air compressor air inlet.

(3) Install the oil level gage in the compressor crankcase.

3-10. Air Receiver Tank.

a. Open draincock (1) daily to remove moisture from the air receiver tank.



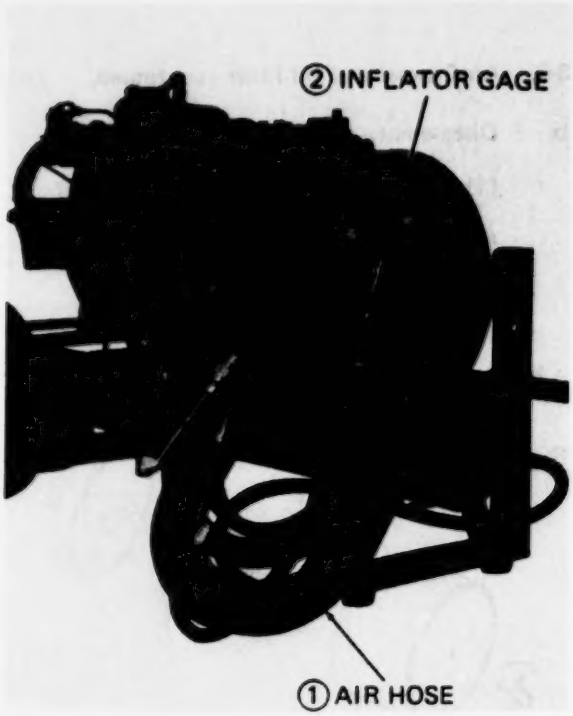
b. Keep all fittings connected to the air receiver tank tight. Check for leaks with soapy water with pressure in air receiver. Check welds on air receiver tank with soapy water.

3-11. Air Discharge System.

a. Examine fittings for defective threads.

b. Examine hoses (1) for cracks or leaks.

c. Examine inflator gage (2) for cracked dial glass, stripped threads, leaks, and defective handle.



CHAPTER 4

ORGANIZATIONAL MAINTENANCE INSTRUCTIONS

Section I. REPAIR PARTS, SPECIAL TOOLS AND EQUIPMENT

4-1. Special Tools and Equipment.

No special tools or equipment are required by organizational maintenance personnel for maintenance of the air compressor.

4-2. Repair Parts.

Repair parts are listed and illustrated in the repair parts and special tools list covering organizational maintenance for this equipment, TM 5-4310-360-24P.

Section II. LUBRICATION INSTRUCTIONS

4-3. General.

a. This section contains lubrication instructions which are supplemental to and not specifically covered in the lubrication orders illustrated in figure 3-1 and figure 3-2.

b. Carefully inspect the engine and air compressor to ensure that proper specifications have been met as requested in the lubrication orders.

NOTE: Proper preventive maintenance observation and adherence will prolong the life of the air compressor unit.

4-4. Detailed Lubrication Information.

Refer to detailed lubrication information in paragraph 3-2.

Section III. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

4-5. General.

To ensure that the air compressor is ready for operation at all times, it must be inspected systematically so that defects may be discovered and corrected before they will result in serious damage or failure. Defects discovered during operation of the unit shall be noted for future correction, to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noticed which would damage the equipment if operation were continued. All deficiencies and shortcomings will be recorded together with the corrective action taken on DA Form 2404 (Equipment Inspection and Maintenance Worksheet) at the earliest possible opportunity.

4-6. Preventive Maintenance Checks and Services.

a. This paragraph contains a tabulated listing of preventive maintenance services which must be performed by organizational maintenance personnel at quarterly intervals. A quarterly interval is equal to 3 calendar months, or 250 hours of operation, whichever occurs first.

4-6. Preventive Maintenance Checks and Services - continued.

b. The item numbers are listed consecutively and indicate the frequency of minimum requirements. Refer to table 4-1 for the quarterly preventive maintenance services. It should be noted that the item number column is used as a source of item numbers for the TM number column on DA Form 2404, Equipment Inspection and Maintenance Worksheet, in recording results of Preventive Maintenance Checks and Services.

Table 4-1. Organizational Preventive Maintenance Checks and Services Quarterly Schedule

Item No.	Item To Be Inspected	Procedures Check For And Have Repaired, Replaced, Adjusted As Necessary	For Readiness Reporting, Equipment Is Not Ready/Available If:
1	Drive Belts	Inspect for improper tension, excessive wear and cracked or frayed condition. Refer to paragraph 4-14 for adjustment or replacement of drive belts.	Belts are cracked or missing.
2	Aftercooler and Intercooler	Inspect for leaks, damage, and loose connections. Replace a defective tube. Refer to paragraph 4-15.	
3	Safety Relief Valve	Inspect for improper operation and insecure mounting. Refer to paragraph 4-20.	Valve leaks or improper operation.
4	Controls and Instruments	Inspect for damage and insecure mounting. With the unit operating, check for improper operation.	Controls are damaged or missing
5	Air Receiver Tank	Inspect for leaks and damage. Refer to paragraph 4-25.	Tank leaks or drain cock is missing plug or inoperative.
6	Fuel Tank	Check fuel level. Inspect for leaks, loose and missing hardware. Refer to paragraph 4-12.	Tank leaks
7	Compressor Crankcase Oil Level	Check oil level. Add oil as indicated on sight glass. See figure 3-1 for proper type of oil to use.	Oil level below add or over full mark.
8	Tires, Tubes and Wheels	Inspect for cuts, foreign objects and damage. Check air pressure. Proper pressure is 25 psi (1.75 kg/sq cm). Refer to paragraph 4-30.	
9	Engine Oil Level	Check oil level. Add oil as indicated on oil gauge. See figure 3-2 for proper type of oil to use.	Oil level below add or over full mark.

Section IV. TROUBLESHOOTING

4-7. General.

This section provides useful information for diagnosing and correcting unsatisfactory operation or failure of the air compressor and its components. Each malfunction stated is followed by a list of tests and inspections. Any trouble beyond the scope of organizational maintenance shall be reported to direct support maintenance.

4-8. Organizational Maintenance Troubleshooting.

Perform troubleshooting functions in accordance with table 4-2.

Table 4-2. Troubleshooting

Malfunction
Test or Inspection
Corrective Action

1. ENGINE KNOCKS.

Step 1. Check for loose flywheel or pulley.

Tighten the flywheel or pulley.

a. Removal.

(1) See figure 4-2 for removal of belt guard cover.

(2) Remove the screws holding the belt guard cover to the belt guard body.

(3) Remove the guard cover.

(4) Loosen the engine mounting bolts and slide the engine sufficiently to remove the belts.

(5) Loosen capscrews and remove drive pulley and key.

(6) Inspect the pulley for cracks and breaks and the key for chips and burrs. See that the key fits snugly in the keyway.

b. Installation.

(1) Install pulley and key and tighten capscrews.

(2) Loosen nut on flywheel hub and remove flywheel and key.

(3) Inspect the flywheel for chips and cracks.

(4) Inspect the key for chips, burrs, and a snug fit.

(5) Install the flywheel and key and tighten nut.

(6) Reinstall the belts and slide the engine until proper tension is obtained on the belts. Belt deflection should be 0.75 to 1.0 inch (19.05 to 25.4 mm) midway between pulleys. Tighten the engine mounting bolts.

(7) Install the guard cover by attaching to the guard body with screws.

4-8. Organizational Maintenance Troubleshooting - continued.

Table 4-2. Troubleshooting (cont)

Malfunction
Test or Inspection
Corrective Action

2. SLOW PUMPING OR INSUFFICIENT PRESSURE.

Step 1. Inspect for clogged compressor air cleaner.

Clean element.

a. Removal and disassembly.

(1) Remove the compressor air cleaner from cylinder head by turning counterclockwise.

(2) See figure 3-3 for disassembly of compressor air cleaner.

(3) Remove screws, nuts and remove cover.

(4) Remove filter element from base.

WARNING: Drycleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact by wearing rubber or solvent impermeable gloves when handling the solvent or material wet with drycleaning solvent. Wash hands immediately after exposure with soap and water and use a lanolin based skin cream to prevent skin drying. Do not use near open flame or excessive heat. Flash point of solvent is 100°F (38°C). Ensure that ventilation adequate to reduce solvent vapor concentrations below acceptable threshold limit values is provided.

WARNING: When using compressed air for blowing, air hose pressure must not exceed 30 psig, and individuals must wear eye protective equipment.

(5) Clean the air cleaner with cleaning solvent, P-D-680, and dry thoroughly.

(6) Clean filter element by blowing out with air or washing with an approved cleaning solvent.

(7) Assemble element into base and install cover.

(8) Attach nuts and screws.

(9) Install cleaner on cylinder head by turning clockwise.

4-8. Organizational Troubleshooting - continued.

Table 4-2. Troubleshooting (cont)

Malfunction
Test or Inspection
Corrective Action

2. SLOW PUMPING OR INSUFFICIENT PRESSURE. (cont)

Step 2. Check for leaks in air lines, valves, fittings, etc.

Locate leaks and tighten or replace threaded parts.

a. Build up air pressure in compressor.

b. Using soapy water, check for leaks at all valves, fittings, etc.

c. Tighten threaded parts or, if necessary, replace damaged parts, after releasing pressure.

Step 3. Determine if compressor is too small for equipment being operated. Check the air pressure requirements of the equipment being serviced. If it is greater than the output of this compressor, push this one aside and obtain a compressor unit of a large enough capacity to perform the required job.

Step 4. Check to determine if engine is at correct speed.

WARNING: Operation of this equipment presents a noise hazard to personnel in the area. The noise level exceeds the allowable limits for unprotected personnel. Wear ear muffs or earplugs which were fitted by a trained personnel.

Adjust the engine speed governor control to obtain correct speed. See TM 5-2805-256-14.

3. EXCESSIVE OIL CONSUMPTION.

Step 1. Check for wrong type of inferior grade of oil.

In order to be certain of proper oil, drain crankcase and refill with proper type and amount.

Step 2. Check for loose oil line or fitting.

Tighten oil line or fitting.

Look for oil leakage around oil line or fittings. If leakage is present tighten oil line fittings.

4. NOISY OPERATION.

Step 1. Check for loose external parts.

Examine compressor carefully, tightening any loose bolts, screws, nuts or other threaded parts that might be generating noise.

Step 2. Check for insufficient oil.

Check oil with oil level gage.

4-8. Organizational Troubleshooting - continued.

Table 4-2. Troubleshooting (cont)

Malfunction
Test or Inspection
Corrective Action

5. EXCESSIVE VIBRATION.

Step 1. Check for loose compressor or engine mounts.

Tighten all the bolts holding the engine and compressor to the truck frame.

Step 2. Check if belts are out of alignment.

Realign belts.

a. Refer to figure 4-2 for removal of belt guard.

b. Loosen nuts attaching guard to handtruck frame.

c. Loosen screw attaching guard to compressor. Remove guard.

d. Loosen nut on hub of flywheel pulley and adjust pulley on shaft until belts align between pulleys. Tighten nut.

e. Install guard by attaching screw to compressor and nuts to handtruck frame.

6. COMPRESSOR OVERHEATING.

Step 1. Check for dirt in cooling coil and cylinder fins.

Using air hose blow dirt from cooling coils and fins.

Step 2. Check for poor ventilation and high room temperature.

If compressor cannot be moved, check possibility of piping intake to cooler location.

7. INTAKE AIR CLEANER NOT FILTERING PROPERLY.

Step 1. Inspect the compressor air cleaner for the presence of moisture or dirt.

Replace defective filter element or the complete cleaner assembly if required.

a. Removal. Remove the air cleaner from cylinder head by turning counterclockwise.

b. Disassembly.

(1) Remove the wingnut and cover and remove the element from the air cleaner base.

4-8. Organizational Troubleshooting - continued.

Table 4-2. Troubleshooting (cont)

Malfunction
Test or Inspection
Corrective Action

7. INTAKE AIR CLEANER NOT FILTERING PROPERLY. (cont)

c. Cleaning and inspection.

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WARNING: When using compressed air for blowing, air hose pressure must not exceed 30 psig, and individuals must wear eye protective equipment.

(1) Clean the air cleaner with cleaning solvent, P-D-680, and dry thoroughly.

(2) Clean filter element by blowing out with air or washing with cleaning solvent, P-D-680.

(3) Inspect the air cleaner for cracks, dents, breaks, and other damage.

d. Reassembly and installation.

(1) Assemble filter element (4) into base (5) and cover (3).

(2) Install nuts and screws (1).

(3) Install the air cleaner assembly to cylinder head by turning clockwise.

8. AIR LEAKAGE.

Step 1. Check for defective safety relief valve.

Replace a defective valve.

a. Removal.

(1) Open the air tank drain valve and drain all air from the compressor.

(2) Remove the safety relief valve by turning it counterclockwise.

4-8. Organizational Troubleshooting - continued.

Table 4-2. Troubleshooting (cont)

Malfunction
Test or Inspection
Corrective Action

8. AIR LEAKAGE. (cont)

b. Cleaning and inspection.

WARNING: Dry cleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact by wearing rubber or solvent impermeable gloves when handling the solvent or material wet with drycleaning solvent. Wash hands immediately after exposure with soap and water and use a lanolin based skin cream to prevent skin drying. Do not use near open flame or excessive heat. Flash point of solvent is 100°F (38°C). Ensure that ventilation adequate to reduce solvent vapor concentrations below acceptable threshold limit values is provided.

Wash the safety valve with cleaning solvent, P-D-680. Inspect for cracks in the body of the valve. Inspect the threads for wear or damage. Replace a defective safety relief valve.

NOTE: This valve is preset at 80 psi (5.6 kg/sq cm). A defective valve should be replaced rather than repaired.

c. Installation.

(1) Install the intercooler safety relief valve in the compressor cylinder head by turning valve counterclockwise.

(2) Recharge air system.

Step 2. Check if air receiver tank drain valve is loose.

The air tank drain valve is underneath the tank and if found to be loose, tighten it. If it is found to be defective in any way, replace it.

Step 3. Check if air hose or fittings are leaking.

Tighten any loose fittings and replace a leaking air hose.

Section V. RADIO INTERFERENCE SUPPRESSION

4-9. General.

Radio interference suppression is attained by providing a low-resistance path to ground for stray currents. The methods used on the military engine include shielding the high-frequency and ignition wires, grounding the frame with bonding straps, and using radio frequency filters composed of capacitors and resistors.

4-10. Interference Suppression Components.

a. Spark Plug. The spark plugs are integrally shielded and suppressed and are located in the cylinder head.

b. Spark Plug Cable. The high tension spark plug cable is encased in braided metal shields. It is connected to the spark plug and engine coil cover.

c. Bonding Strap. The bonding strap is connected to the governor and accessory case cover.

4-11. Replacement of Suppression Components.

a. Spark Plug. Loosen the nut on the spark plug cable and remove the cable. Remove the spark plug. Before installing the spark plug, check the gap between the electrodes with a wire or leaf thickness gage. A slight drag should be felt. The desired clearance is 0.028 inch (0.07112 cm) to 0.030 inch (.08382 cm). Adjust the gap by bending the outside electrode until the gap is properly set. Install the plug. Use a torque wrench and tighten the spark plug to 275-300 inch-pounds.

b. Spark Plug Cables. Loosen the connector nut on each of the cable and remove the cable. When installing the cable, make sure the coil spring on each end of the spark plug cable is seated before tightening the connector nuts.

c. Bonding Strap. Remove the nut attaching the bonding strap to the contact assembly cover. Remove the screw attaching the bonding strap to the governor housing. Remove the bonding strap. When installing the bonding strap, make sure the contact assembly cover nut and the governor housing screw are tight.

Section VI. MAINTENANCE OF FUEL SYSTEM

4-12. Fuel Tank Assembly.

a. Removal.

(1) Remove drain plug (9, figure 4-1) and drain contents of the fuel tank into a suitable container.

(2) Disconnect fuel hose assembly (10) from fuel tank.

(3) Remove cap screw (1), nut (2), lockwasher (3) and hanger (4) from fuel tank. Remove fuel tank.

(4) Remove cap and chain (6), gasket (7) and strainer (8) from fuel tank.

b. Cleaning and Inspection.

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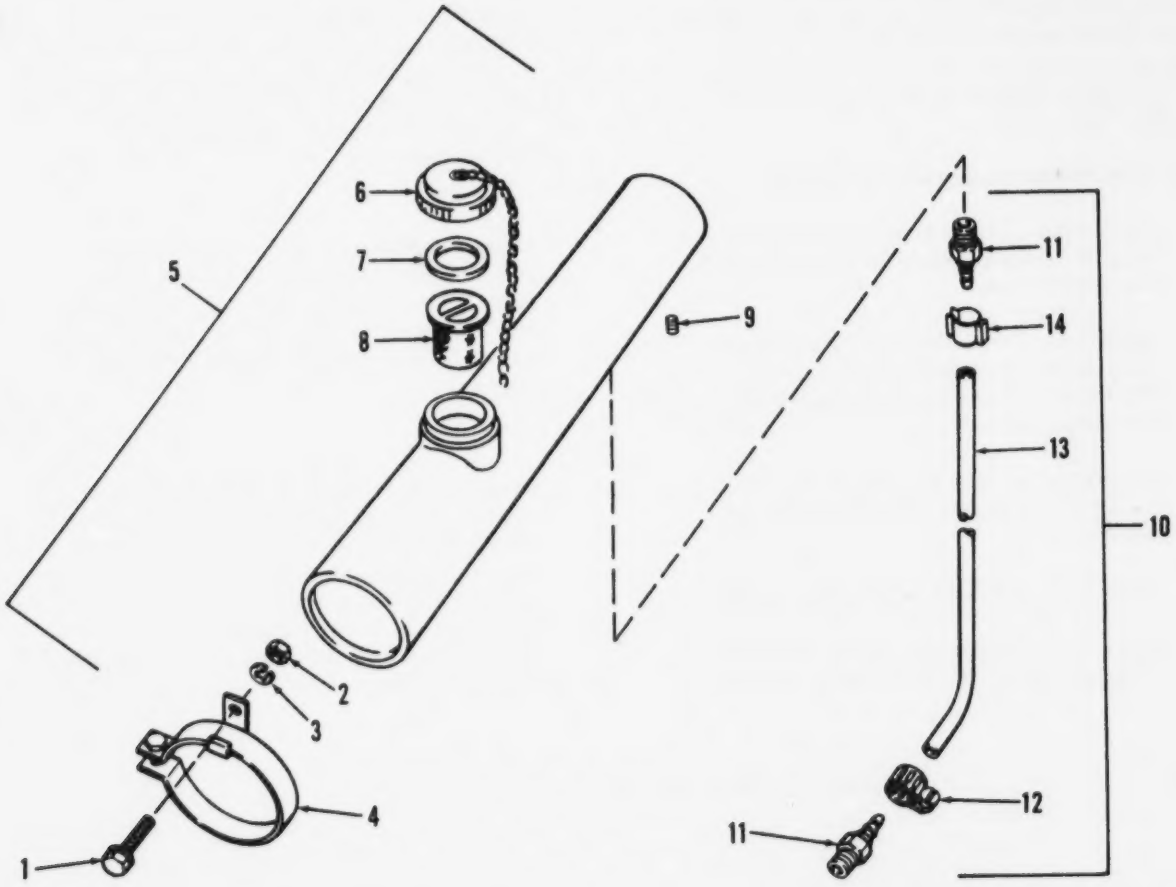
4-12. Fuel Tank Assembly - continued.



1. Cap screw
2. Nut
3. Lockwasher
4. Fuel tank hanger
5. Fuel tank assembly
6. Cap and chain
7. Gasket
8. Strainer
9. Plug
10. Fuel hose assembly
11. Fitting
12. Clamp
13. Hose
14. Clamp

Figure 4-1. Fuel tank and fuel hose, removal and installation.

4-12. Fuel Tank Assembly - continued.

(1) Clean all parts with an approved cleaning solvent and dry thoroughly.

(2) Inspect all parts for dents or breaks.

(3) Inspect the nuts and bolts for stripped threads and worn heads.

(4) Replace any defective part.

c. Repairing. If tank leaks at threaded connections, remove plug and/or fuel line elbow from bottom of tank and run 1/8 inch NPT pipe tap into threads to correct crossthreading or damaged threads. Do not tap too deep as oversize hole will result. Reassemble plug and elbow and check for leaks. If leak still persists, replace fuel tank. Fuel tank ends and seam are soldered and leaks developing can be repaired by soldering at leak point.

d. Installation.

(1) Install strainer (8, figure 4-1), gasket (7) and cap and chain (6) in fuel tank.

(2) Attach fuel tank with hanger (4), lockwasher (3), nut (2) and capscrew (1).

(3) Attach fuel hose assembly (10) to fuel tank.

(4) Install drain plug (9).

(5) Service the fuel tank.

4-13. Fuel Hose Assembly.

a. Removal.

(1) Remove drain plug (9, figure 4-1) and drain contents of the fuel tank into a suitable container.

(2) Disconnect fuel hose assembly (10) at the engine and fuel tank.

b. Cleaning and Inspection.

WARNING: Drycleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact by wearing rubber or solvent impermeable gloves when handling the solvent or material wet with drycleaning solvent. Wash hands immediately after exposure with soap and water and use a lanolin based skin cream to prevent skin drying. Do not use near open flame or excessive heat. Flash point of solvent is 100°F (38°C). Ensure that ventilation adequate to reduce solvent vapor concentrations below acceptable threshold limit values is provided.

WARNING: When using compressed air for blowing, air hose pressure must not exceed 30 psig, and individuals must wear eye protective equipment.

(1) Clean the fuel line by blowing compressed air through the line. If the line contains a gummy deposit, soak the line in cleaning solvent, P-D-680, and dry thoroughly.

(2) Inspect the fuel line for cracks, split, or frayed ends. Replace the fuel line if it is defective.

c. Installation.

(1) Attach fuel hose assembly (10) to the engine and fuel tank.

(2) Install drain plug (9).

(3) Service the fuel tank.

Section VII. MAINTENANCE OF PNEUMATIC EQUIPMENT

4-14. Belt Guard and Pulley.

a. Removal.

WARNING: Do not operate the air compressor with the belt guard removed.

(1) Remove machine screw (1, figure 4-2) and belt guard cover (2).

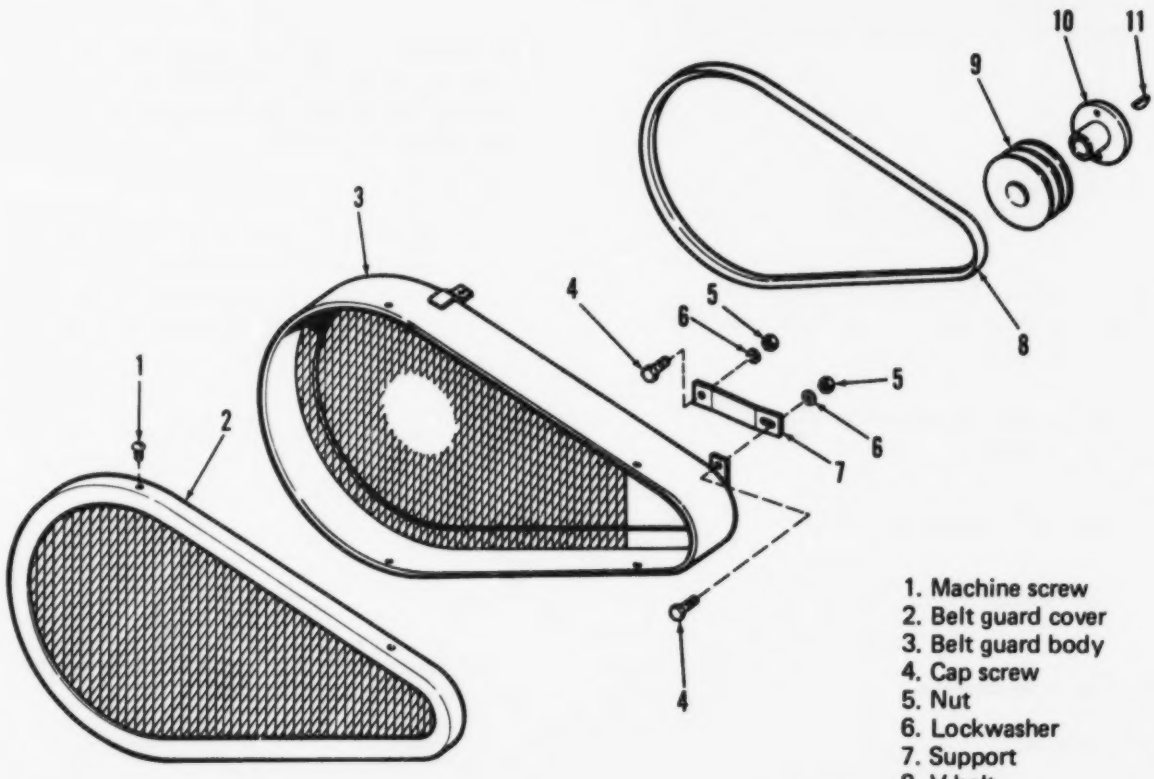
(2) Loosen engine mounting bolts (1, figure 4-5) to release tension on V-belts (8, figure 4-2). Remove V-belts.

(3) Remove pulley (9) and bushing (10) as an assembly. Remove key (11).

(4) Remove compressor flywheel (5, figure 4-3).

(5) Remove cap screws (4, figure 4-2), nuts (5), lockwashers (6) and support (7).

(6) Lift out belt guard (3).



1. Machine screw
2. Belt guard cover
3. Belt guard body
4. Cap screw
5. Nut
6. Lockwasher
7. Support
8. V-belt
9. Pulley
10. Bushing
11. Key

Figure 4-2. Belt guard, removal and installation.

4-14. Belt Guard and Pulley - continued.

b. Cleaning and Inspection.

(1) Clean the V-belts with a clean dry cloth, taking care to remove all dirt, grease and oil.

(2) Inspect the V-belts for cuts, fraying and wear.

(3) Replace worn or damaged V-belts.

NOTE: Always replace the V-belts in matched set of two.

WARNING: Drycleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact by wearing rubber or solvent impermeable gloves when handling the solvent or material wet with drycleaning solvent. Wash hands immediately after exposure with soap and water and use a lanolin based skin cream to prevent skin drying. Do not use near open flame or excessive heat. Flash point of solvent is 100°F (38°C). Ensure that ventilation adequate to reduce solvent vapor concentrations below acceptable threshold limit values is provided.

(4) Clean all metal parts with cleaning solvent, P-D-680.

(5) Inspect the V-belt guard and mounting support for dents, cracks or other damage. Straighten minor dents and bends in the guard and support.

(6) Inspect all attaching hardware for damaged threads. Replace damaged attaching hardware and replace an unserviceable guard, support or other defective part.

c. Installation and Adjustment.

(1) Install belt guard (3, figure 4-2).

(2) Attach support (7) with cap screws (4), nuts (5) and lockwashers (6).

(3) Install compressor flywheel (5, figure 4-3).

(4) Install key (11, figure 4-2), bushing (10) and pulley (9) on engine shaft.

(5) Install V-belts (8) and adjust tension to obtain belt deflection of 3/4 to 1 inch midway between pulleys. Tighten engine mounting bolts (1, figure 4-5).

(6) Install belt guard cover (2, figure 4-2) with machine screw (1).

4-15. Air Compressor Assembly.

a. Removal.

(1) Release all air from the compressor by opening the drain valve of the air receiver tank.

WARNING: Do not operate the air compressor with the belt guard removed.

(2) Remove machine screw (1, figure 4-2) and belt guard cover (2).

(3) Loosen engine mounting bolts to release tension on V-belts (8). Remove V-belts.

(4) Loosen cap screw (3, figure 4-3) and nut (4). Remove flywheel (5) and key (6).

(5) Unscrew compression nuts on elbows (8) and remove breather tube (7). Remove elbows (8).

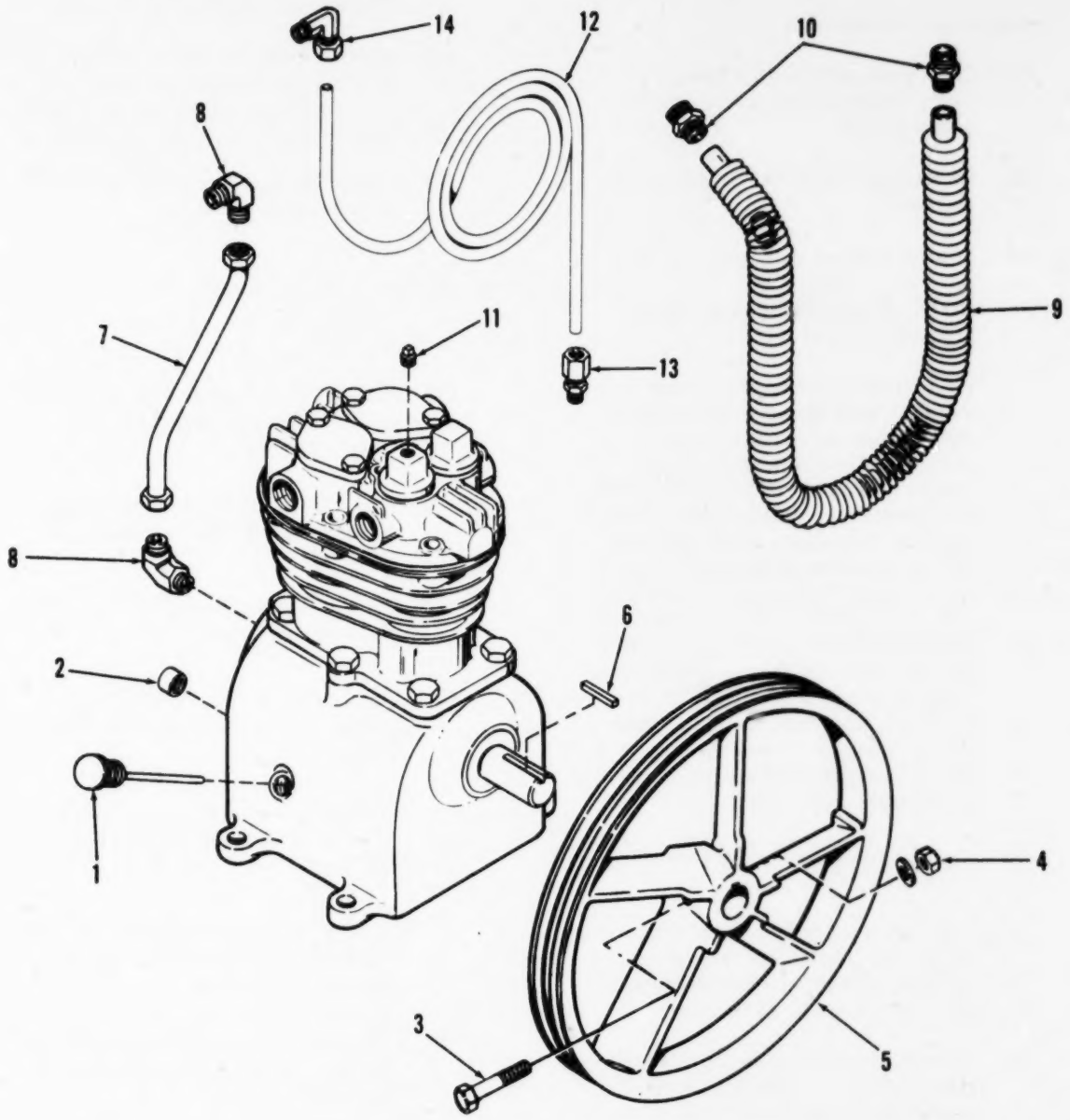
(6) Unscrew compression nuts on fittings (10) and remove intercooler tube (9). Remove fittings (10).

(7) Unscrew compression nuts on fitting (13) and elbow (14) and remove aftercooler tube (12). Remove fitting (13) and elbow (14).

(8) Remove plug (11) from the compressor cylinder head by turning the plug counterclockwise.

(9) Remove mounting hardware and lift compressor from base.

4-15. Air Compressor Assembly - continued.



1. Oil gage
2. Cap
3. Cap screw
4. Nut
5. Flywheel
6. Key
7. Breather tube
8. Elbow
9. Intercooler tube
10. Fitting
11. Plug
12. Aftercooler tube
13. Fitting
14. Elbow

Figure 4-3. Air compressor, removal and installation.

4-15. Air Compressor Assembly - continued.

b. Cleaning and Inspection.

(1) Clean the V-belts with a clean dry cloth, taking care to remove all dirt, grease and oil.

(2) Inspect the V-belts for cuts, fraying and wear.

(3) Replace worn or damaged V-belts.

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(4) Wash the safety relief valve with cleaning solvent, P-D-680.

(5) Inspect for cracks in the body of the valve.

(6) Inspect the threads for wear or damage.

(7) Replace a defective safety relief valve.
NOTE: This valve is preset at 60 psi (4.22 kg/sq cm). A defective valve should be replaced rather than repaired.

(8) Clean all other parts with cleaning solvent, P-D-680.

(9) Inspect the flywheel pulley for chips and cracks.

(10) Inspect the key for chips, burrs and snug fit.

(11) Replace any defective parts.

(12) Inspect the V-belt guard and mounting brackets for dents, cracks or other damage. Straighten minor dents and bends in the guard and brackets.

(13) Inspect all attaching hardware for damaged threads. Replace damaged attaching hardware and replace an unserviceable guard, bracket or other defective part.

(14) Blow out all grease and dirt collected inside the tubes.

(15) Inspect the tubes for dents, holes and cracks. Replace a defective tube.

c. Installation.

(1) Install plug (11, figure 4-3) in the compressor cylinder head.

(2) Place compressor on base and install mounting hardware.

(3) Attach aftercooler tube (12) with fitting (13) and elbow (14).

(4) Attach intercooler tube (9) with fittings (10).

(5) Attach breather tube (7) with elbows (8).

(6) Install flywheel (5) and key (6). Tighten cap screw (3) and nut (4) to 43 footpounds.

(7) Install V-belts (8, figure 4-2) and adjust tension to obtain belt deflection of 3/4 to 1 inch midway between pulleys. Tighten engine mounting bolts.

(8) Install belt guard cover (2) with machine screw (1).

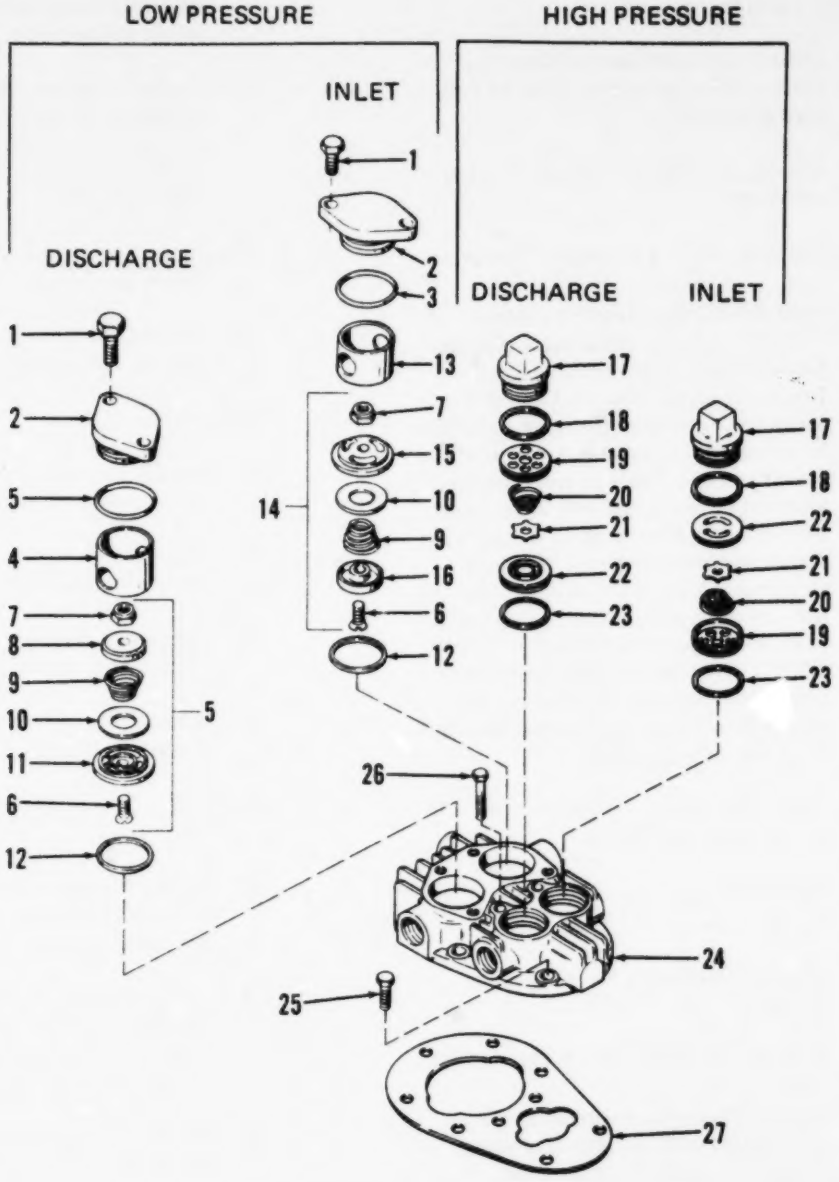
(9) Service compressor crankcase. (See figure 3-1.)

4-16. Cylinder Head, Intake and Exhaust Valves.

a. Disassembly.

(1) Remove the cylinder head (24, figure 4-4) and discard gasket (27).

4-16. Cylinder Head, Intake and Exhaust Valves - continued.



1. Cap screw
2. Valve cover
3. O-ring
4. Cage
5. Discharge valve assembly
6. Screw
7. Nut
8. Valve retainer
9. Spring
10. Valve plate
11. Valve seat
12. Gasket
13. Cage
14. Inlet valve assembly
15. Valve seat
16. Valve retainer
17. Valve cover
18. Gasket
19. Valve retainer
20. Spring
21. Valve plate
22. Valve seat
23. Gasket
24. Cylinder head
25. Cap screw
26. Cap screw
27. Gasket

Figure 4-4. Cylinder head and valves disassembly and assembly.

4-16. Cylinder Head, Intake and Exhaust Valves - continued.

(2) Remove the low pressure valve covers (2) and remove discharge and inlet valve components. The discharge valve assembly (5) and the inlet valve assembly (14) can be further disassembled by removing screws (6) and nuts (7). Keep discharge and inlet valve components separate.

(3) Remove the high pressure valve covers (17) and gaskets (18).

(4) Unscrew valve seats (22) and valve retainers (19) and remove the valve plates (21) and springs (20).

(5) Remove gasket (23).

b. Cleaning, Inspection and Repair.

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(1) Clean all parts with cleaning solvent, P-D-680, and dry thoroughly.

(2) Inspect all valve seats and valve discs for cracks, breaks, rough or scored surfaces.

(3) Inspect the springs for distortion, weak tension or broken coils.

(4) Inspect the cylinder head for defective valve seats.

(5) Inspect the valve gaskets for distortion or imprints that will render them unserviceable.

(6) Repair after inspection.

(7) Valves and valve seats must be flat and can sometimes be resurfaced by rubbing on fine (No. 400) emery cloth held on a smooth flat surface.

(8) Replace all defective parts that cannot be repaired.

c. Assembly.

(1) When installing valves be careful not to catch valves between edges of seats and retainers (valves must move freely in retainers when assembled).

(2) Refer to figure 4-4 and make sure that valve components are assembled in the sequence shown. The high pressure inlet and discharge valves have identical components but must be assembled in a different sequence to work.

(3) Install the high pressure inlet and discharge valve components. Torque the retainers (19) and seats (22) to 50 footpounds.

(4) Assemble the low pressure inlet valve assembly (14) and discharge valve assembly (5).

(5) Install the valve components in the sequence shown in figure 4-4.

(6) Install valve covers (2) with screws (1).

(7) Install a new gasket (27) and install the cylinder head (24) on the air compressor.

Section VIII. MAINTENANCE OF ENGINE ASSEMBLY

4-17. Description

The military standard engines described in this manual are 4-stroke cycle, overhead valve and aircooled type. These engines have design features for radio frequency interference suppression; complete with fungus proofing. This Military Standard Engine develops 1-1/2 HP at 3,600 revolutions per minute (rpm). Other featues designed into the engines are overhead valves with rotators which increase valve life. The valve seat inserts are made of high wear resistance materials, and the combustion chambers have a semi-hemispherical design. These engines are also designed with a splash lubrication system, wet and dry air cleaners, heavy duty tapered main bearings, standard size 18 millimeter spark plugs, centrifugal type mechanical governors, diaphragm fuel pumps, and capabilities of efficient starting and operation at temperatures to minus 25°F (-31.7°C).

WARNING: Operation of this equipment presents a noise hazard to personnel in the area. The noise level exceeds the allowable limits for unprotected personnel. Wear ear muffs or ear plugs which were fitted by a trained professional.

4-18. Test.

Start the engine and operate at full load, if possible, for one hour minimum. Any discrepancies discovered during this period will be noted and referred to Direct Support Maintenance.

4-19. Removal, Inspection and Servicing, and Installation.

a. Removal.

(1) Remove the belt guard, belts and pulley per paragraph 4-2.

(2) Remove the fuel hose assembly (10, figure 4-11).

(3) Remove nuts (2, figure 4-5), flatwashers (3), lockwashers (4) and bolts (1). Lift engine (8) from the hand truck.

(4) Remove cap screws (5), lockwashers (6) and engine mounting brackets (7).

(5) Pack the starting rope and the fuel filter in a waterproof protective bag and attach to the engine.

b. Inspection and Servicing.

Refer to TM 5-2805-256-14/24P for inspection and servicing procedures for the engine assembly.

c. Installation.

(1) Detach the bag containing the starter rope and the fuel filter from the replacement engine.

(2) Attach mounting brackets (7, figure 4-5) to engine with cap screws (5) and lockwashers (6).

(3) Place engine (8) in position on hand truck and attach with bolts (1), lockwashers (4), flatwashers (3) and nuts (2).

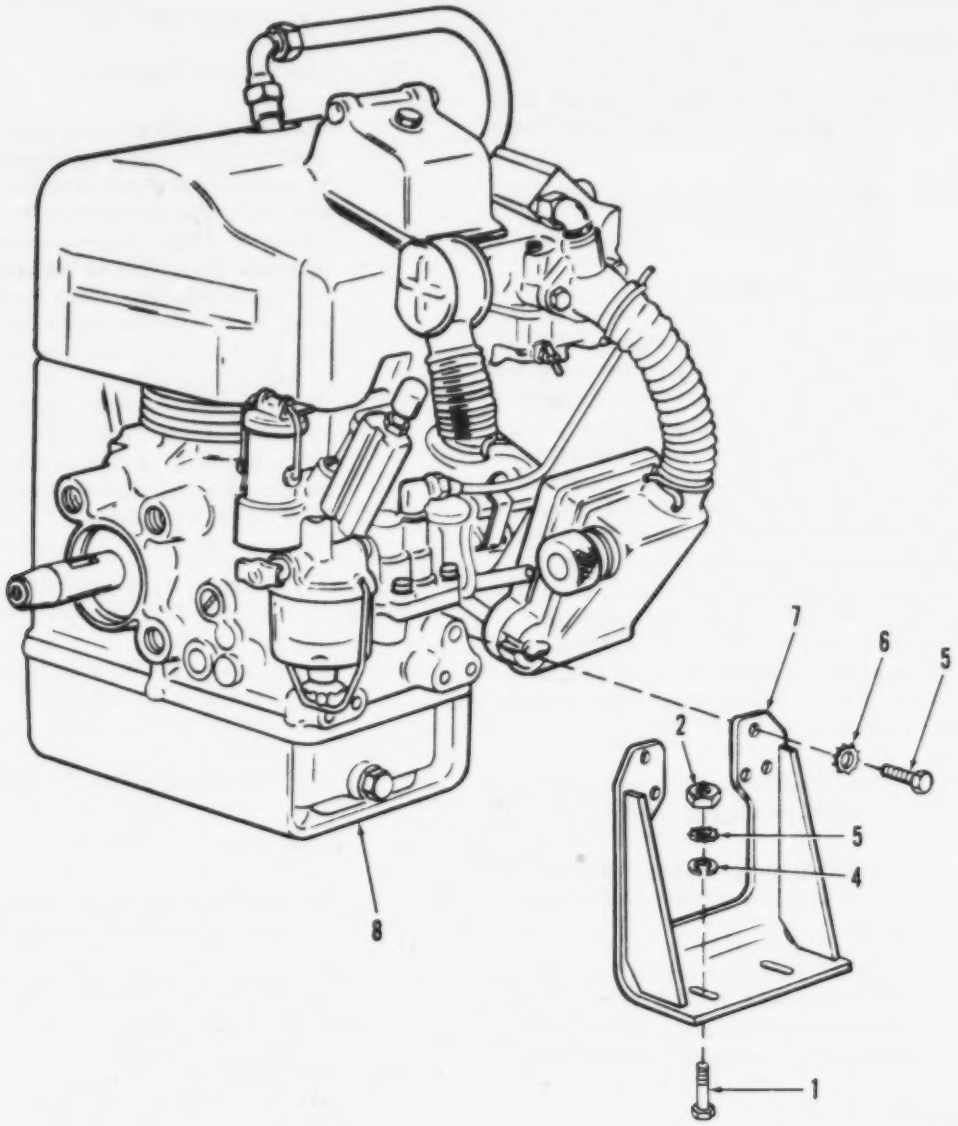
(4) Attach the fuel hose assembly (10, figure 4-1). Care should be exercised when mounting to ensure that threads are not crossed and that the fittings are tight and do not leak. Use the recommended pipe seal or compound to seal the threads and fittings.

(5) Loosen the four engine mounting bolts (1, figure 4-5) and install the V-belts. Adjust belt tension to obtain belt deflection of 3/4 to 1 inch midway between pulleys. Tighten engine mounting bolts.

(6) Install belt guiard per paragraph 4-11.

(7) Service the engine crankcase. (See figure 3-2.)

4-19. Removal, Inspection and Servicing, and Installation - continued.



1. Bolt
2. Nut
3. Flatwasher
4. Lockwasher
5. Cap screw
6. Lockwasher
7. Bracket
8. Engine

Figure 4-5. Engine, removal and installation.

Section IX. MAINTENANCE OF AIR RECEIVER SYSTEM

4-20. Safety Relief Valve.

a. Removal.

(1) Release air from the air receiver tank (16, figure 4-6) by opening draincock (9).

(2) Remove safety relief valve (5) from the air receiver tank.

b. Cleaning and Inspection.

WARNING: Drycleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact by wearing rubber or solvent impermeable gloves when handling the solvent or material wet with drycleaning solvent. Wash hands immediately after exposure with soap and water and use a lanolin based skin cream to prevent skin drying. Do not use near open flame or excessive heat. Flash point of solvent is 100°F (38°C). Ensure that ventilation adequate to reduce solvent vapor concentrations below acceptable threshold limit values is provided.

(1) Clean all parts in cleaning solvent, P-D-680, and dry thoroughly.

(2) Inspect all parts for breaks, cracks and other damage. Replace a defective part.

NOTE: This valve is preset at 200 psi (14.16 kg/sq cm). The internal parts of the release and safety valve cannot be repaired. Replace valve is defective.

c. Installation.

(1) Install safety relief valve (5) in the air receiver tank (16).

(2) Close draincock (9).

4-21. Pressure Gage.

a. Removal.

(1) Release air from the air receiver tank (16, figure 4-6) by opening draincock (9).

(2) Remove pressure gage (10) from the air receiver tank (16).

b. Cleaning and Inspection.

WARNING: Drycleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact by wearing rubber or solvent impermeable gloves when handling the solvent or material wet with drycleaning solvent. Wash hands immediately after exposure with soap and water and use a lanolin based skin cream to prevent skin drying. Do not use near open flame or excessive heat. Flash point of solvent is 100°F (38°C). Ensure that ventilation adequate to reduce solvent vapor concentrations below acceptable threshold limit values is provided.

(1) Wash pressure gage case with cleaning solvent, P-D-680, and dry thoroughly.

(2) Inspect gage for cracked dial glass, bent or broken needle, missing fluid, and stripped threads.

(3) Replace gage if found to be defective.

c. Installation.

(1) Screw pressure gage (10, figure 4-6) tightly to the air receiver tank (16).

(2) Close draincock (9).

4-22. Draincock.

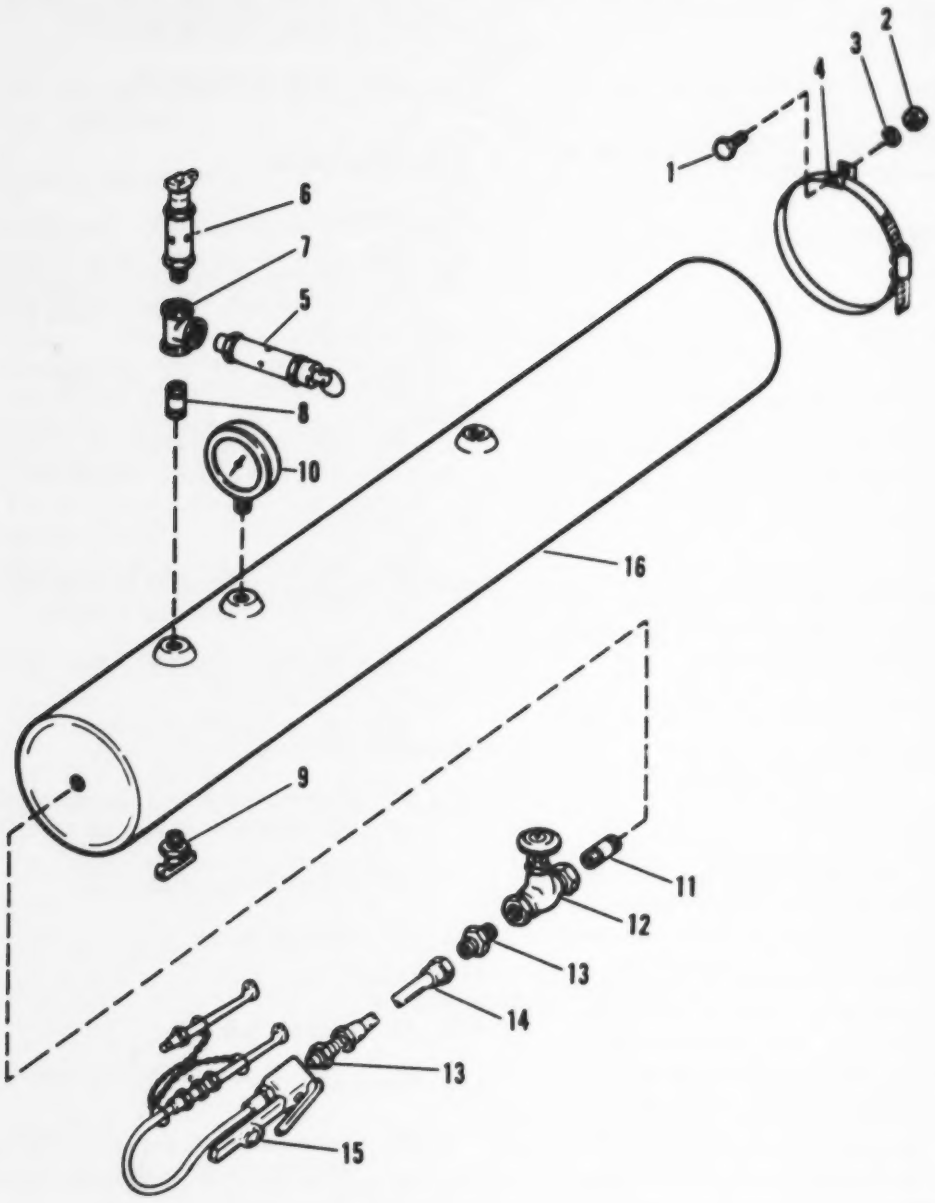
a. Removal.

(1) Release air from the air receiver tank (16, figure 4-6) by opening draincock (9).

(2) Remove draincock (9) from the air receiver tank (16).

b. Inspection.

(1) Inspect draincock for obstructions and stripped threads.



1. Cap screw
2. Nut
3. Lockwasher
4. Tank hanger
5. Safety Relief valve
6. Unloader valve
7. Tee
8. Nipple
9. Draincock
10. Pressure gage
11. Nipple
12. Globe valve
13. Hose adapter
14. Hose
15. Inflator gage
16. Air receiver tank

Figure 4-6. Air Receiver Tank, Removal and Installation.

4-22. Draincock - continued.

(2) Replace draincock if found to be defective.

c. Installation.

(1) Screw draincock (9) tightly to the air receiver tank (16).

(2) Close draincock (9).

4-23. Unloader Valve.

a. General.

The unloader valve is a spring loaded release valve set to open at 175 psi.

b. Removal.

(1) Release air from the air receiver tank (16, figure 4-6) by opening draincock (9).

(2) Remove unloader valve (6) from the air receiver tank.

c. Cleaning and Inspection.

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(1) Clean unloader assembly with cleaning solvent, P-D-680, and dry thoroughly.

(2) Examine mounting threads for defective threads or cracks.

(3) Replace defective unloader.

d. Installation.

(1) Install unloader valve (6, figure 4-6) in the air receiver tank (16).

(2) Close draincock (9).

4-24. Globe Valve.

a. Removal.

(1) Release air from the air receiver tank (16, figure 4-6) by opening draincock (9).

(2) Remove hose adapter (13).

(3) Remove globe valve (12) and nipple (11) from the air receiver tank (16).

b. Inspection.

(1) Inspect globe valve for obstructions, stripped threads, and leaks.

(2) Replace globe valve if found to be defective.

c. Installation.

(1) Screw globe valve (12) and nipple (11) tightly to the air receiver tank (16).

(2) Attach hose adapter (13).

(3) Close draincock (9).

4-25. Air Receiver Tank.

a. Removal.

(1) Release air from the air receiver tank (16, figure 4-6) by opening draincock (9).

(2) Remove safety and relief valve (5) from the air receiver tank.

(3) Remove air pressure gage (10) from the air receiver tank.

(4) Remove draincock (9) from the air receiver tank.

(5) Remove hose adapter (13).

4-25. Air Receiver Tank - continued.

(6) Remove globe valve (12) and nipple (11) from the air receiver tank (16).

(7) Remove the air receiver tank from the hand truck.

b. Cleaning and Inspection.

WARNING: Drycleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact by wearing rubber or solvent impermeable gloves when handling the solvent or material wet with drycleaning solvent. Wash hands immediately after exposure with soap and water and use a lanolin based skin cream to prevent skin drying. Do not use near open flame or excessive heat. Flash point of solvent is 100°F (38°C). Ensure that ventilation adequate to reduce solvent vapor concentrations below acceptable threshold limit values is provided.

(1) Clean all metal parts with cleaning solvent, P-D-680, and dry thoroughly. Clean the glass on the gage with solvent and dry with a lint-free cloth.

(2) Clean the interior of the air tank with live stream, if available, or with an approved cleaning solvent. Dry thoroughly.

(3) Inspect metal parts for cracks, rust or damaged threads. Inspect the glass for cracks.

(4) Inspect the interior and exterior of the tank for cracks, broken welds, dents or corrosion. Check threaded surfaces for damaged threads.

(5) Replace defective parts.

c. Installation.

(1) Attach the air receiver tank (16, figure 4-6) to the hand truck.

(2) Attach globe valve (12) and nipple (11) to the air receiver tank.

(3) Install hose adapter (13).

(4) Attach draincock (9) to the air receiver tank.

(5) Attach air pressure gage (10) to the air receiver tank.

(6) Attach safety and relief valve (5) to the air receiver tank.

Section X. MAINTENANCE OF AIR DISCHARGE SYSTEM

4-26. Hoses and Inflator Gage.

a. Removal.

(1) Release air from the air receiver tank (16, figure 4-6) by opening drainclock (9).

(2) Remove inflator gage (15), air hose (14) and adapters (13).

b. Cleaning and Inspection.

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(1) Clean hose fittings with cleaning solvent, P-D-680, and dry thoroughly.

(2) Examine fittings for defective threads.

4-26. Hoses and Inflator Gage - continued.

(3) Examine hose for cracks or leaks.

(4) Examine inflator gage for cracked dial glass, stripped threads, leaks, and defective handle.

(5) Replace defective hose assembly or inflator gage.

c. Installation.

(1) Install adapters (13, figure 4-6), air hose (14) and inflator gage (15).

(2) Close draincock (9).

Section XI. MAINTENANCE OF HANDTRUCK ASSEMBLY

4-27. General.

The compressor handtruck assembly is constructed as a welded unit. The handtruck serves as a compressor frame and is equipped with wheels and tires for easy movement to a new worksite.

4-28. Frame.

a. Removal.

(1) Release all air from the air tank by opening the draincock.

(2) Remove the belt guard and V-belts.

(3) Disconnect fuel line at fuel filter.

(4) Remove the nuts, washers and capscrews holding engine assembly brackets to handtruck. Lift engine assembly from handtruck.

(5) Loosen tube nuts and remove aftercooler tube and intercooler tube.

(6) Remove nuts and screws holding compressor to handtruck and remove compressor.

(7) Disconnect fuel line at fuel tank.

(8) Remove nuts holding brackets and hangers and remove fuel tank.

(9) Remove nuts and bolts holding air receiver tank to handtruck and remove tank.

(10) Jack up the axle end of the handtruck and block securely.

(11) Release air from tires.

(12) Remove cotter pins (2, figure 4-7), nuts (1, figure 4-8), washers (7, figure 4-7), nuts (2, figure 4-8), hub bolts (3) and capscrews (4).

(13) Disassemble the wheel disc halves (5), tubes (6) and tires (7).

(14) Disassemble end caps (8), bearing seals (9), roller bearings (10) and hubs (11).

(15) Remove nuts (5, figure 4-7), feet (6) and capscrews (5).

b. Cleaning and Inspection.

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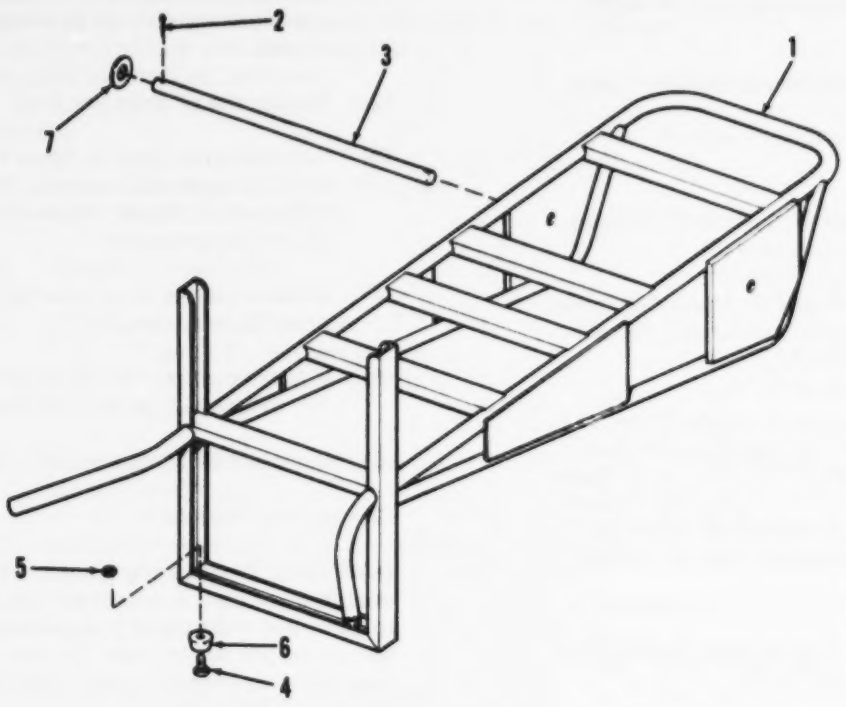
(1) Wash all parts with cleaning solvent, P-D-680, and dry thoroughly.

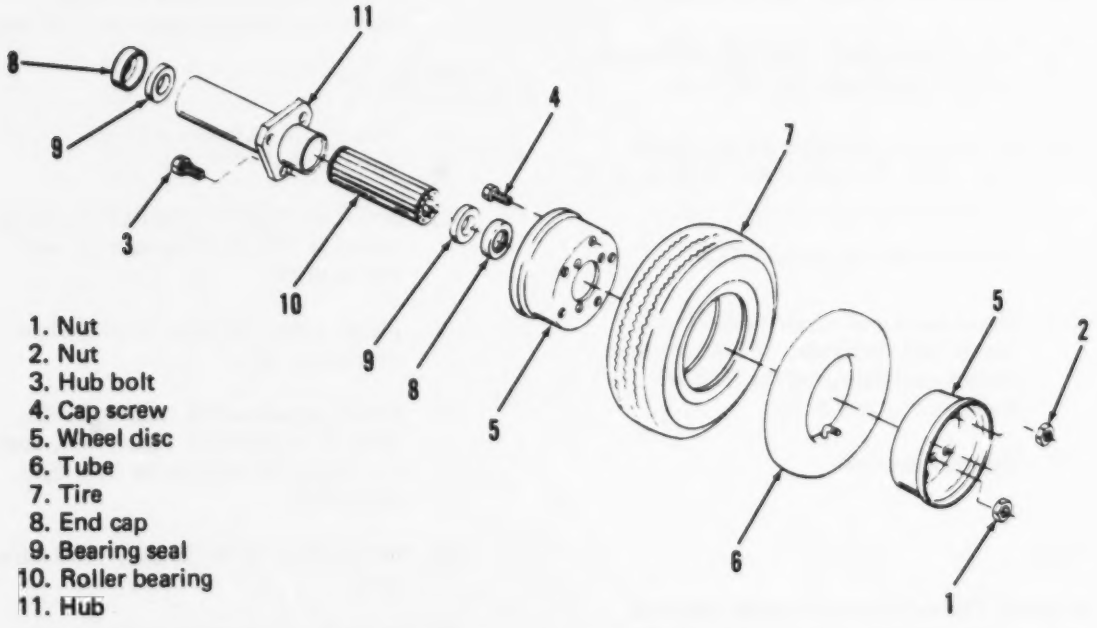
(2) Inspect all parts for cracks, breaks or bends.

4-28. Frame - continued.



1. Handtruck
2. Cotter pin
3. Axle
4. Cap screw
5. Nut
6. Foot
7. Washer

Figure 4-7. Handtruck assembly, disassembly and reassembly.



1. Nut
2. Nut
3. Hub bolt
4. Cap screw
5. Wheel disc
6. Tube
7. Tire
8. End cap
9. Bearing seal
10. Roller bearing
11. Hub

Figure 4-8. Wheel assembly, disassembly and reassembly.

4-28. Frame - continued.

(3) Inspect all hardware for damaged threads.

(4) Repair or replace all defective parts.

c. Installation.

(1) Attach feet (6, figure 4-7) with capscrews (4) and nuts (5).

(2) Assemble hubs (11, figure 4-8), roller bearings (10), bearing seals (9) and end caps (8).

(3) Assemble tires (7), tubes (6), wheel disc halves (5), capscrews (4), hub bolts (3), nuts (2), washers (7, figure 4-7) and nuts (1, figure 4-8). Attach to axle with cotter pins (2, figure 4-7). Service tires to 25 psi (1.766 kg/sq cm).

(4) Attach air receiver tank to handtruck with nuts and bolts.

(5) Attach fuel tank with brackets, hangers and nuts. Attach fuel line to fuel tank.

(6) Attach compressor to handtruck.

(7) Attach aftercooler tube and intercooler tube to compressor and air tank.

(8) Place engine assembly on handtruck and fasten. Do not tighten bolts at this time.

(9) Connect fuel line to fuel filter.

(10) Install belts and adjust tension to obtain belt deflection of 3/4 to 1 inch midway between pulleys. Tighten engine mounting bolts.

(11) Install belt guard.

4-29. Axle.

a. General. The axle is a cylindrical steel rod used to attach the wheel assemblies to the handtruck assembly.

b. Removal.

(1) Jack up the axle end of the handtruck and block securely under the bumper or rails.

(2) Release the air from the tires.

(3) Remove cotter pins (2, figure 4-7), nuts (1, figure 4-8), washers (7, figure 4-7), nuts (2, figure 4-8), hub bolts (3) and capscrews (4).

(4) Disassemble the wheel disc halves (5), tubes (6) and tires (7).

(5) Disassemble end caps (8), bearing seals (9), roller bearings (10) and hubs (11).

(6) Remove axle (3, figure 4-7).

c. Cleaning and Inspection.

WARNING: Drycleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F (38°C).

(1) Wash axle with cleaning solvent, P-D-680, and dry thoroughly.

(2) Inspect axle for cracks or bends. Replace axle if damaged beyond usage.

d. Installation.

(1) Install axle (3, figure 4-7) on handtruck.

(2) Assemble hubs (11, figure 4-8), roller bearings (10), bearing seals (9) and end caps (8).

(3) Install tubes (6), tires (7) and wheel disc halves (5).

(4) Install capscrews (4), hub bolts (3), nuts (2), washers (7, figure 4-7), nuts (1, figure 4-8) and cotter pins (2, figure 4-7).

(5) Inflate the tires to 25 psi (1.766 kg/sq cm).

(6) Remove the blocking and lower the jack.

4-30. Wheels and Tires.

a. General. The compressor assembly is mounted on a handtruck, equipped with two rubber tired wheels with roller bearings mounted on the truck axle hub.

b. Removal.

(1) Jack up the axle end of the compressor assembly and block securely.

(2) Release air from tires.

(3) Remove cotter pins (2, figure 4-7), nuts (1, figure 4-8), washers (7, figure 4-7), nuts (2, figure 4-8), hub bolts (3) and capscrews (4).

(4) Disassemble the wheel disc halves (5), tubes (6) and tires (7).

(5) Disassemble end caps (8), bearing seals (9), roller bearings (10) and hubs (11).

c. Cleaning and Inspection.

WARNING: Drycleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact. Do not use near open flame or excessive heat. Flash point of solvent is 100°F (38°C).

(1) Wash interior all parts with cleaning solvent, P-D-680, and dry thoroughly.

(2) Inspect bearings, seals and retainers for breaks or excessive wear. Service bearings or replace if necessary.

(3) Inspect tires and tubes for cuts, breaks or holes.

d. Repair.

(1) Replace defective tires.

(2) Replace defective tube if beyond repair.

(3) If tube is repairable proceed as follows:

(a) Rasp area around hold to rough up surface and remove any film.

(b) Apply layer of tube cement to area around puncture. Allow to dry.

(c) Peel protective film from patch and apply patch to cemented area.

(d) Roll or press edges of patch to assure proper adhesion.

e. Installation.

(1) Assemble hubs (11, figure 4-8), roller bearings (10), bearing seals (9) and end caps (8).

(2) Assemble tires (7) and tubes (6) onto wheel disc halves (5) with capscrews (4) and nuts (2).

(3) Attach to hub with hub bolts (3) and nuts (1). Attach washers (7, figure 4-7) and cotter pins (2).

(4) Inflate tires to 25 psi (1.766 kg/sq cm).

(5) Remove blocking and jacks.

CHAPTER 5

DIRECT AND GENERAL SUPPORT MAINTENANCE INSTRUCTIONS

Section I. REPAIR PARTS, SPECIAL TOOLS AND EQUIPMENT

5-1. Special Tools and Equipment.

No special tools are required to perform direct and general support maintenance on the compressor.

5-2. Repair Parts.

Repair parts are listed and illustrated in the repair parts and special tools list TM 5-4310-310-24P, and TM 5-2805-256-24P (Engine).

5-3. Fabricated Tools and Equipment.

No specially fabricated tools and equipment are required by direct and general support maintenance personnel to perform maintenance on the compressor.

Section II. TROUBLESHOOTING

5-4. General.

a. This section contains troubleshooting information for locating and correcting most of the operating troubles which may develop in the compressor. Each malfunction for an individual component, unit, or system is followed by a list of tests or inspections which will help you to determine corrective actions to take. You should perform the tests/inspections and corrective actions in the order listed.

b. This manual cannot list all malfunctions that may occur, nor all tests or inspections and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor.

5-5. Direct and General Support Maintenance Troubleshooting.

Table 5-1 outlines the troubleshooting information.

5-5. Direct and General Support Maintenance Troubleshooting - continued.

NOTE

Before you use this table, be sure you have performed all applicable operating checks.

Table 5-1. Troubleshooting

Malfunction
Test or Inspection
Corrective Action

ENGINE

1. COMPRESSOR FAILS TO PUMP TO PRESSURE.

Step 1. Check to see if belts are improperly adjusted.

Adjust or replace belts. Refer to paragraph 4-14.

Step 2. Check for broken valve or valve spring.

Remove cylinder head and replace defective parts. Refer to paragraph 4-16.

2. COMPRESSOR KNOCKS.

Step 1. Check for loose flywheel pulley.

Tighten flywheel nut. Refer to paragraph 4-15.

Step 2. Check for broken valve or valve spring.

Remove cylinder head and replace defective parts. Refer to paragraph 4-16.

Step 3. Check for connecting rod bearings worn or rod bolts loose.

Tighten connecting rod bolts or replace connecting rod. Refer to paragraph 6-2.

3. COMPRESSED AIR CONTAINS OIL.

Step 1. Check for worn piston or piston rings.

Replace piston or piston rings. Refer to paragraph 6-2.

Step 2. Check for worn or scored cylinder bore.

Replace cylinder. Refer to TM 5-2805-256-14/24P.

Section III. GENERAL MAINTENANCE

5-6. General.

Refer to Chapters 3 and 4 for operator and organization preventive maintenance checks and services.

5-7. General Disassembly Procedures.

a. Components to be repaired shall be disassembled to the extent required for complete serviceability.

b. Serviceable, precision, matched or mated parts shall be marked, handled and stored to preclude damage and to insure reassembly and installation in their matched and mated positions in the same assembly or component.

5-8. General Repair and/or Replacement Criteria.

a. In-process inspection shall be performed on each assembly, subassembly and component parts being repaired to insure strict adherence to criteria established by this manual.

b. Welding shall assure complete fusion and penetration and be in compliance with specifications and standards referenced herein.

5-9. General Reassembly Procedures.

a. General precautions shall be adhered to during reassembly to insure that all internal parts have been properly installed and necessary tolerance checks performed.

b. Upon completion of reassembly, unit shall be lubricated in accordance with Lubrication Order.

CHAPTER 6

REPAIR INSTRUCTIONS

Section I. REPAIR OF PNEUMATIC EQUIPMENT

6-1. General.

The compressor is a two-stage, two-cylinder, air cooled unit. There is one low-pressure piston and one high-pressure piston operating off the crankshaft. The major repair instructions are those covering replacement of the cylinder head, and valves, pistons and rings, connecting rods, crankshaft, cylinder and crankcase.

6-2. Pistons, Rings, Connecting Rods, Cylinder Block, Crankshaft and Crankcase.

a. Removal and Disassembly.

(1) Loosen hub nut and remove flywheel.

(2) Remove cap screws (27, figure 6-1) holding cylinder (29) to crankcase (2, figure 6-2) and lift off cylinder. Mark top of each piston on side nearest pulley so that they can be reinstalled in the same position.

(3) Remove key (7) from crankshaft (6) and file the edges of the keyway to remove burrs, thus avoiding damage to the oil seal when removing crankshaft.

(4) Remove end cover (11) and slide crankshaft with connecting rods and pistons, out of crankcase being careful not to damage the oil feeder ring (8). Place pulley end of crankshaft in a vise using soft jaws to prevent damage.

(5) To remove pistons (6, 19, figure 6-1) remove washers (8 and 21) from end of wrist pins (7 and 20) and drive wrist pins out of pistons at ambient temperature. It is not necessary to heat piston. Remove piston rings (3, 4, 5, 16, 17 and 18) from pistons.

(6) When removing connecting rods (10 and 23) from crankshaft by removing rod cap screws (13 and 26) and lockwashers (12 and 25) from connecting rods, be sure that rods and caps (10 and 23) are kept in matched sets. Note the position, with reference to the crankshaft, of the identification marks on one side of each so that the connecting rod can be replaced in the same position it originally occupied. Remove bushings (11 and 24) only if worn or scored.

(7) Drive oil seal (1, figure 6-2) out of crankcase if replacement is necessary, by evenly spaced blows from inside.

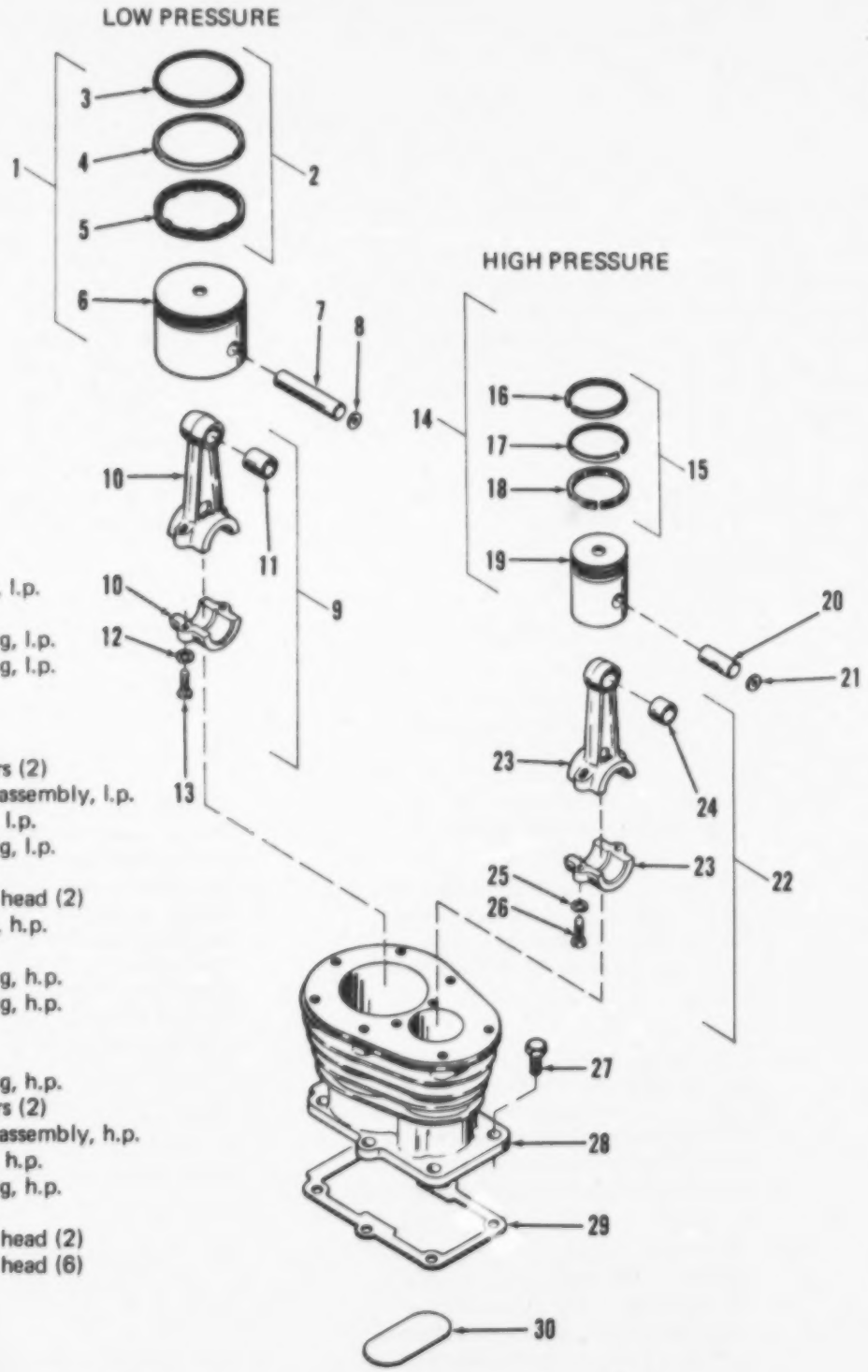
b. Cleaning, Inspection and Repair.

WARNING: Drycleaning solvent, P-D-680, used to clean parts is potentially dangerous to personnel and property. Avoid repeated and prolonged skin contact by wearing rubber or solvent impermeable gloves when handling the solvent or material wet with drycleaning solvent. Wash hands immediately after exposure with soap and water and use a lanolin based skin cream to prevent skin drying. Do not use near open flame or excessive heat. Flash point of solvent is 100°F (38°C). Ensure that ventilation adequate to reduce solvent vapor concentrations below acceptable threshold limit values is provided.

(1) Clean all parts with cleaning solvent, P-D-680, and dry thoroughly.

(2) Examine cylinder bores for wear, scoring, pitting, cracks or other damage. Replace cylinder with damaged bores.

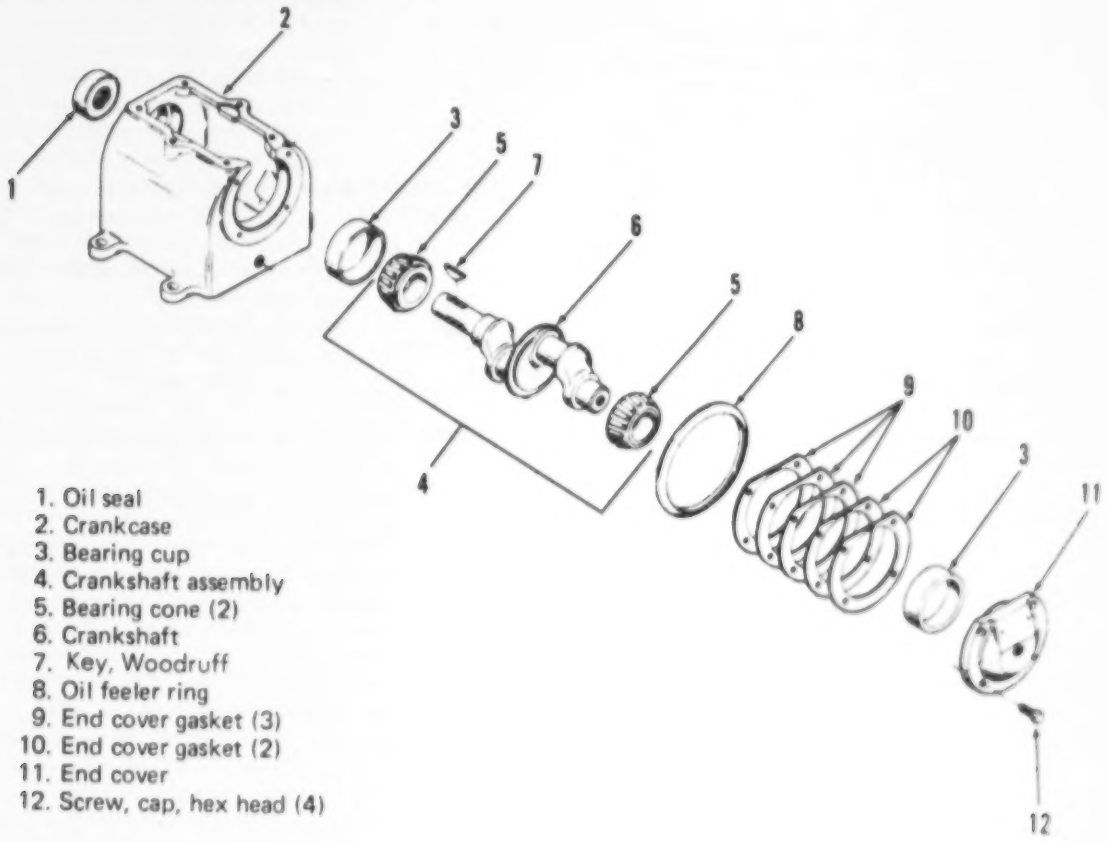
6-2. Pistons, Rings, Connecting Rods, Cylinder Block, Crankshaft and Crankcase - continued.



1. Piston assembly, l.p.
2. Ring set, l.p.
3. Compression ring, l.p.
4. Compression ring, l.p.
5. Oil ring, l.p.
6. Piston, l.p.
7. Wrist pin
8. Wrist pin washers (2)
9. Connecting rod assembly, l.p.
10. Connecting rod, l.p.
11. Wrist pin bushing, l.p.
12. Lockwasher (2)
13. Screw, cap, hex head (2)
14. Piston assembly, h.p.
15. Ring set, h.p.
16. Compression ring, h.p.
17. Compression ring, h.p.
18. Oil ring, h.p.
19. Piston, h.p.
20. Wrist pin bushing, h.p.
21. Wrist pin washers (2)
22. Connecting rod assembly, h.p.
23. Connecting rod, h.p.
24. Wrist pin bushing, h.p.
25. Lockwasher (2)
26. Screw, cap, hex head (2)
27. Screw, cap, hex head (6)
28. Cylinder
29. Base gasket
30. Oil ring plate

Figure 6-1. Cylinder head, pistons and connecting rod.

6-2. Pistons, Rings, Connecting Rods, Cylinder Block, Crankshaft and Crankcase - continued.



1. Oil seal
2. Crankcase
3. Bearing cup
4. Crankshaft assembly
5. Bearing cone (2)
6. Crankshaft
7. Key, Woodruff
8. Oil feeler ring
9. End cover gasket (3)
10. End cover gasket (2)
11. End cover
12. Screw, cap, hex head (4)

Figure 6-2. Crankshaft and crankcase.

(3) Measure the clearance between small end of connecting rod and wrist pin. Also measure the clearance between large end of connecting rod and crankshaft. Refer to table 1-1 for allowable clearances.

(4) Examine crankshaft and pistons for wear, scuffing, scoring, etc., and replace parts damaged. If parts exceed clearance listed in table 1-1, replace them.

(5) Inspect tapered roller bearing for rough, pitted, or scored surfaces. Replace a defective bearing.

c. Reassembly and Installation.

(1) Crankshaft - crankcase. Before assembling, the crankshaft (6, figure 6-2) must be fitted to the crankcase (2). Install cover (11), gaskets (9 and 10) and secure with end cover screws (12) evenly. End cover gaskets (9 and 10) serve as shims and are furnished in two thicknesses. The proper combination must be selected so crankshaft (6) can be spun in the bearings without end play. Refer to table 1-2 for end play allowance. Also see that oil feed ring (8, figure 6-2) rotates freely on the crankcase. Remove crankshaft from the crankcase and hold long end in a vise using soft jaws to prevent damage.

6-2. Pistons, Rings, Connecting Rods, Cylinder Block, Crankshaft and Crankcase - continued.

(2) Piston-cylinder. Check fit before assembling pistons to connecting rods. Piston without rings must slide through the cylinder of their own weight and holding the skirt of the piston with the two thumbs there should be no appreciable side motion at any point of piston travel. Refer to table 1-1 for allowable clearance.

(3) Wrist pin-piston. Wrist pins (7 and 20, figure 6-1) must be a tap fit with a soft hammer in piston bores at ambient temperature. Be sure fibre washers (8 and 21) at each end of the wrist pins (7 and 20) are in place before assembling to cylinder. Assemble piston rings (5, 6, 7, 16, 17 and 18) to pistons (6 and 19). Top two rings are compression rings and dot stamped on side of rings indicates top of ring. Oil rings (7 and 18) cannot be installed upside down as either position is correct.

(4) Connecting rod - crankshaft. Install bearing caps (10 and 23, figure 6-1) and secure with washers (12 and 25) and screws (13 and 26). Tap cap lightly to make sure bearing is making contact and tighten rod bolts. Torque bolts to 8 foot-pounds. The combined piston and connecting rod should turn on the crankshaft of their own weight if bearing adjustment is correct. If tight, cut paper shims and install between cap and rod. If loose, file cap until fit is sufficiently tight. Correct clearance between connecting rod and crankshaft journal is 0.0011 inch to 0.0019 inch (0.0028 cm to 0.0048 cm). Refer to table 1-1 for allowable wear clearance.

(a) Reinstall crankshaft with pistons and crankshaft attached, being careful not to damage oil feeder ring (8, figure 6-2) when fitting within lugs at bottom of crankcase (2) and being sure there are no burrs or dirt on the pulley end of the crankshaft that might cut the oil seal (1). Replace oil feeder ring plate (30, figure 6-1).

(b) If oil seal (1, figure 6-2) is to be replaced, slide on over crankshaft and press into place in the crankcase, the lip or seal side toward the crankcase. Do not hammer directly on the seal.

(5) Cylinder-crankcase. Coat bottom end of cylinder bores (28, figure 6-1) and piston rings with oil and assemble cylinder over pistons. The bottom of the cylinder bores are chamferred and rings will compress into piston grooves by pressing cylinder downward and twisting slightly from side to side. After cylinder is in place and before cap screws (27) are tightened, rotate crankshaft two or three times for self-alignment. Tighten cap screws (27) and torque to 18 foot-pounds. Install key (7, figure 6-2) and flywheel (5, figure 4-3) after cylinder head and intercooler is assembled. Torque flywheel bolt to 43 foot-pounds.

(6) Be sure crankcase is filled to proper level with oil before operating or running in.

6-3. Efficiency Test.

After compressor assembly is completely reassembled and all connections are checked for leaks, the compressor should pump up the air receiver from 0 to 100 psi (0 to 7.03 kg/sq cm) in 22 seconds.

Section II. ENGINE

6-4. General.

Refer to TM 5-2805-256-14/24P for repair instructions and parts lists for the engine.

APPENDIX A

REFERENCES

A-1. SCOPE.

This appendix lists all forms, field manuals, and technical manuals referenced in this manual.

A-2. FORMS.

Equipment Inspection and Maintenance Work Sheet ..... DA Form 2404
Quality Deficiency Report ..... SF 368
Recommended Changes to DA Publications ..... DA Form 2028

A-3. TECHNICAL MANUALS.

Operator, Organizational, DS and GS Maintenance Manual, Engine, Gasoline, 1-1/2 HP Military Standard . TM 5-2805-256-14

Organizational, DS and GS and Depot Maintenance Repair Parts and Special Tools Lists, Engine, Gasoline, 1-1/2 HP Military Standard ..... TM 5-2805-256-24P

Organizational, DS and GS Maintenance Repair Parts and Special Tools Lists, Compressor, Reciprocating Air, Hand-truck Mounted, Gas engine Driven, 5 CFM, 175 PSI ..... TM 5-4310-360-24P

The Army Maintenance Management System (TAMMS) ..... TM 38-750

A-4. MISCELLANEOUS PUBLICATIONS.

Lubrication order, Engine Gasoline L05-2805-256-12

APPENDIX B

COMPONENTS OF END ITEM LIST

Section I. INTRODUCTION

B-1. Scope.

This appendix lists integral components of and Basic Issue Items (BII) for the Air Compressor to help you inventory items required for safe and efficient operation.

B-2. General.

The components of end item list are divided into the following sections:

a. Section II, Integral Components of the End Item. These items, when assembled, comprise the Air Compressor and must accompany it whenever it is transferred or turned in. The illustrations will help you identify these items.

b. Section III, Basic Issue Items. These are minimum essential items required to place the Air Compressor in operation, to operate it, and to perform emergency repairs. Although shipped separately packed they must accompany the Compressor during operation and whenever it is transferred between accountable officers. The illustrations will assist you with hard-to-identify items. This manual is your authority to requisition replacement BII, based on TOE/MTOE authorization of the end item.

B-3. Explanation of Columns.

a. Illustration. This column is divided as follows:

(1) Figure Number. Indicates the figure number of the illustration on which the item is shown.

(2) Item Number. The number used to identify item called out in the illustration.

b. National Stock Number. Indicates the National stock number assigned to the item and which will be used for requisitioning.

c. Part Number. Indicates the primary number used by the manufacturer, which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items.

d. Description. Indicates the Federal item name and, if required, a minimum description to identify the item.

e. Location. The physical location of each item listed is given in this column. The lists are designed to inventory all items in one area of the major item before moving on to an adjacent area.

f. Usable on Code. "USABLE ON" codes are included to help you identify which component items are used on the different models. Identification of the codes used in these lists are:

Code	Used On
MAA	Model 20-902/3

g. Quantity Required (Qty Reqd). This column lists the quantity of each item required for a complete major item.

h. Quantity. This column is left blank for use during an inventory. Under the Rcv'd column, list the quantity you actually receive on your major item. The Date columns are for your use when you inventory the major item at a later date, such as for shipment to another site.

Section II. INTEGRAL COMPONENTS OF END ITEM

(1) ILLUSTRATION (a) FIGURE NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) NATIONAL STOCK NO.	(3) PART NO. & FSCM	(4) DESCRIPTION	(5) LOCATION	(6) USABLE ON CODE	(7) QTY REQD	(8) QUANTITY RCVD	(8) QUANTITY DATE	(8) QUANTITY DATE	(8) QUANTITY DATE
4-6		4720-00-874-3179	Z538A (11568)	Hose Assy., Air		MAA	1				
4-6		4910-00-030-2365	61J21506 (94694)	Gauge Assy., Inflator		MAA	1				

APPENDIX C
ADDITIONAL AUTHORIZATION LIST

Section I. INTRODUCTION

C-1. Scope.

This appendix lists additiional items you are authorized for the support of the Air Compressor.

C-2. General.

This list identifies items that do not have to accompany the Air Compressor and that do not have to be turned in with it. These items are authorized to you by CTA, MTOE, TDA or JTA.

C-3. Explanation of Listing.

National stock number, descriptions, and quantities are provided to help you identify and request the additional items you require to support this equipment. "USABLE ON" codes are identified as follows:

Code	Used On
MAA	Model 20-902/3

Section II. ADDITIONAL AUTHORIZATION LIST

(1)(2) NATIONAL STOCK NUMBER	PART NUMBER & FSCM	(3) DESCRIPTION	(4) USABLE ON CODE	U/M	QTY AUTH
7520-00-550-9618		Cotton Duck Case	MAA	EA	1
7510-00-880-3494		Log Book Binder	MAA	EA	1
4210-00-555-8837		Fire Extinguisher	MAA	EA	1
4240-00-022-3448		Protector, Aural	MAA	EA	1

APPENDIX D
EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

D-1. Scope.

This appendix lists expendable supplies and materials you will need to operate and maintain the Air Compressor.

These items are authorized to you by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

D-2. Explanation of Columns.

a. Column 1 - Item number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use cleaning compound, item 5, App. D").

b. Column 2 - Level. This column identifies the lowest level of maintenance that requires the listed item.

(enter as applicable)

C - Operator/Crew

O - Organizational Maintenance

F - Direct Support Maintenance

H - General Support Maintenance

c. Column 3 - National Stock Number. This is the National stock number assigned to the item; use it to request or requisition the item.

d. Column 4 - Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the part number followed by the Federal Supply Code for Manufacturer (FSCM) in parentheses, if applicable.

e. Column 5 - Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

Section II. EXPENDABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
	O	6850-00-274-5421	Drycleaning Solvent P-D-680	gal

APPENDIX E

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

E-1. General.

a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance levels.

b. The Maintenance Allocation Chart (MAC) in Section II designates overall responsibility for the performance of maintenance functions on the identified end item or component. The implementation of the maintenance functions upon the end item or component will be consistent with the assigned maintenance functions.

c. Section III lists the special tools and test equipment required for each maintenance function as referenced from Section II.

d. Section IV contains supplemental instructions on explanatory notes for a particular maintenance function.

E-2 Maintenance Functions.

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical and/or electrical characteristics with established standards through examination.

b. Test. To verify serviceability and detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulid fluids, or compressed air supplies.

d. Adjust. To maintain, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

e. Align. To adjust specified variable elements of an item to bring about optimum or desired performance.

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. Install. The act of emplacing, seating, or fixing into position an item, part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

h. Replace. The act of substituting a serviceable like type part, subassembly, or module (component or assembly) for an unserviceable counterpart.

i. Repair. The application of maintenance services (inspect, test, service, adjust, align, calibrate or replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

j. Overhaul. That maintenance effort (services/actions) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (i.e., DMWR) in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

E-2. Maintenance Functions.

k. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours/miles, etc.) considered in classifying Army equipments/components.

E-3. Column Entries Used in the MAC.

a. Column 1, Group Number. Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules with the next higher assembly.

b. Column 2, Component/Assembly. Column 2 contains the names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column 3, Maintenance Functions. Column 3 lists the functions to be performed on the item listed in Column 2. (For detailed explanation of these functions, see paragraph D-2.)

d. Column 4, Maintenance Level. Column 4 specifies, by the listing of a "work time" figure in the appropriate subcolumn(s), the lowest level of maintenance authorized to perform the function listed in Column 3. This figure represents the active time required to perform the maintenance function at the indicated level of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance levels, appropriate work time figures will be shown for each level. The number of man-hours specified by the work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting time, and quality assurance/quality control time in addition to the time required to perform the specific tasks indentified for the maintenance functions authorized in the maintenance allocation chart. The symbol designations for the various maintenance levels are as follows:

C ..... Operator or crew

O ..... Organizational maintenance

F ..... Direct support maintenance

H ..... General support maintenance

D ..... Depot maintenance

e. Column 5, Tools and Equipment. Column 5 specifies, by code, those common tool sets (not individual tools) and special tools, test, and support equipment required to perform the designated function.

f. Column 6, Remarks. This column contains a letter code in alphabetic order which is keyed to the remarks contained in Section IV.

E-4. Column Entries Used in Tool and Test Equipment Requirements.

a. Column 1, Tool or Test Equipment Reference Code. The tool and test equipment reference code correlates with a maintenance function on the identified end item or component.

b. Column 2, Maintenance Level. The lowest level of maintenance authorized to use the tool or test equipment.

c. Column 3, Nomenclature. Name or identification of the tool or test equipment.

d. Column 4, National/NATO Stock Number. The National or NATO stock number of the tool or test equipment.

e. Column 5, Tool Number. The manufacturer's part number.

Section II. MAINTENANCE ALLOCATION CHART

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level C	O	F	H	D	(5) Tools and Equipment	(6) Remarks
01	FUEL SYSTEM (TANK, LINES, AND FILTER)								
0101	Tank Assembly, Fuel	Inspect	0.1						
		Replace		0.2				T1	
		Repair		0.3				T1, T4	
		Service	0.1						
0102	Lines and Fittings	Inspect	0.1						
		Replace		0.2				T1	
02	COMPRESSOR DRIVE								
0201	Guard Assembly, Belt	Inspect	0.1						
		Replace		0.2				T1	
		Repair		0.2				T1, T4	
0202	Belts, V, Matched Set	Inspect	0.1						
		Replace		0.2				T1	
0203	Pulley, Drive	Inspect	0.1						
		Replace		0.2				T1, T4	
03	COMPRESSOR ASSEMBLY	Inspect		0.2				T1	
		Replace		0.8				T1	
		Repair			1.0			T1, T	
		Overhaul				4.0		T1, T	
0301	Air Cleaner	Inspect	0.1						
		Replace	0.2					T1	
0302	Oil Filler, Cap, and Plugs	Inspect	0.1						
		Replace	0.2					T1	
0303	Flywheel	Inspect		0.2				T1	
		Replace		0.3				T1, T	
0304	Tube Assemblies	Inspect		0.2				T1	
		Replace		0.3				T1	
0305	Interstage Safety Valve	Inspect		0.1				T1	
		Replace		0.2				T1	
0306	Cylinder Head, Intake and Exhaust Valves	Inspect		0.2				T1, T4	
		Replace		0.3				T1, T4	
		Repair		0.6				T1, T4	
0307	Pistons, Connecting Rods and Cylinder Block	Inspect			0.3			T1, T2	
		Replace			0.5			T1, T2	
		Repair			2.0			T1, T2	

Section II. MAINTENANCE ALLOCATION CHART (cont)

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level C	O	F	H	D	(5) Tools and Equipment	(6) Remarks
0308	Crankshaft, Bearings, Oil Seals and Crankcase	Inspect			0.4			T1, T2	
		Replace			0.6			T1, T2	
		Repair			2.5			T1, T2	
0309	Aftercooler	Inspect			0.1			T1	
		Replace			0.2			T1	
04	ENGINE ASSEMBLY	Inspect		0.1				T1	
		Service		0.2				T1	
		Test		0.3				T1	Refer to engine
		Replace		0.8				T1	TM 5-28256-
		Repair			1.0			T1, T2	14-24P
		Overhaul				4.0		T1, T3	
05	AIR RECEIVER SYSTEM								
0501	Safety Valve	Inspect		0.1				T1	
		Replace		0.2				T1	
0502	Pressure Gage	Inspect		0.1				T1	
		Replace		0.2				T1	
0503	Draincock	Inspect		0.1				T1	
		Replace		0.1				T1	
0504	Globe Valve	Inspect		0.1				T1	
		Replace		0.2				T1	
0505	Air Tank	Inspect	0.1						
		Replace		0.4				T1	
06	AIR DISCHARGE SYSTEM								
0601	Hoses	Inspect	0.1						
		Replace		0.2				T1	
0602	Inflator Gage	Inspect	0.1						
		Replace		0.2				T1	
07	HANDTRUCK ASSEMBLY								
0701	Frame	Inspect		0.1				T1	
		Replace		0.4				T1	
		Repair		0.4				T1	
0702	Axle	Inspect		0.1				T1	
		Replace		0.2				T1	
0703	Wheels	Inspect		0.2				T1	
		Replace		0.3				T1	

Section II. MAINTENANCE ALLOCATION CHART (cont)

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level C	O	F	H	D	(5) Tools and Equipment	(6) Remarks
0704	Tires and Tubes	Inspect		0.1				T1	
		Service		0.1				T1	
		Replace		0.2				T1	
		Repair		0.4				T1	

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS

(1) Reference Code	(2) Maintenance Level	(3) Nomenclature	(4) National/NATO Stock Number	(5) Tool Number
T1	C, O, F, H	Tool Kit, General Mechanic, Automotive	5180-00-177-7033	
T2	F	Shop Set, Automotive Repair, Field Maintenance, Basic	4910-00-754-0705	
T3	H	Shop Set, Machine: Field Maintenance, Heavy	3470-00-754-0738	
T4	O	Shop Equipment Automotive Maintenance and Repair: Organization, Common NO1	4910-00-754-0654	

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By Order of the Secretary of the Army:

BERNARD W. ROGERS
General, United States Army
Chief of Staff

Official:

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THEN. . . JOT DOWN THE DOPE ABOUT IT ON THIS FORM, TEAR IT OUT, FOLD IT AND DROP IT IN THE MAIL!

FROM: (YOUR UNIT'S COMPLETE ADDRESS)
PFC JOHN DOE
COA, 3d ENGINEER BN
FT. LEONARD WOOD MO 63108

DATE

PUBLICATION NUMBER	DATE	TITLE
TM 5-4310-360-14	25 May 1979	Compressor, Reciprocating: Air: Handtruck Mounted, Gasoline Engine

BE EXACT. . . PIN-POINT WHERE IT IS

PAGE NO.	PARAGRAPH	FIGURE NO.	TABLE NO.	IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
6	2-1 a			In line 6 of paragraph 2-1a the manual states the engine has 6 cylinders. The engine on my set only has 4 cylinders. Change the manual to show 4 cylinders.
81		4-3		Callout 16 on figure 4-3 is pointing at a bolt. In the key to fig. 4-3, item 16 is called a shim. Please correct one or the other.
125	line 20			I ordered a gasket, item 19 on figure B-16 by NSN 2910-00-762-3001. I got a gaskit but it doesn't fit. Supply says I got what I ordered so the NSN is wrong. Please give me a good NSN.

SAMPLE

TYPED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER
JOHN DOE, PFC (268) 317-7111

SIGN HERE:
John Doe

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REVERSE OF DA FORM 2028-2 (TEST)

The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimenter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigrams = .035 ounce
1 dekagram = 10 grams = .35 ounce
1 hectogram = 10 dekagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 38.82 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimenter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
inches	centimeters	2.540	ounce-inches	newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29,573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	newton-meters	1.365	metric tons	short tons	1.102
pound-inches	newton-meters	.11375			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C